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NASA TECHNICAL MEMORANDUM



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**FY 1981 SCIENTIFIC AND TECHNICAL REPORTS,
ARTICLES, PAPERS, AND PRESENTATIONS**

Compiled by Sarah S. Thacker
Management Services Office

October 1981

NASA

*George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama*

FOREWORD

In accordance with the NASA Space Act of 1958 the MSFC has provided for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof.

Since July 1, 1960, when the George C. Marshall Space Flight Center was organized, the reporting of scientific and engineering information has been considered a prime responsibility of the Center. Our credo has been that "research and development work is valuable, but only if its results can be communicated and made understandable to others."

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GEORGE C. MARSHALL SPACE FLIGHT CENTER
Marshall Space Flight Center, Alabama

**FY 1981 SCIENTIFIC AND TECHNICAL REPORTS,
ARTICLES, PAPERS, AND PRESENTATIONS**

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NASA TECHNICAL MEMORANDA

TM-78300 May 1979
Thermal Control of High Energy Nuclear Waste, Space Option. Jerry A. Peoples.
Preliminary Design Office. N79-25869

A discussion is presented which relates to the thermal and packaging problems of space disposal of nuclear waste material. An approach is suggested which solves both of these problems with emphasis on high energy density waste material. A passive cooling concept is presented utilizing conduction rods which penetrate the inner core. Data are presented which illustrate the effectiveness of cooling rods and the limit of their capability. A computerized thermal model is discussed and developed for the cooling concept.

TM-78301 June 1979
The Space Telescope Observatory. John N. Bahcall and C. R. O'Dell. Institute for Advanced Study and MSFC.
N79-27043

This review provides a convenient guide to the expected characteristics of the Space Telescope Observatory for astronomers and physicists. We have tried to provide enough detail so that a professional scientist, observer or theorist, can plan how the observatory may be used to further his observing program or to test theoretical models. Further detail is available in NASA documents that are referenced throughout this report.

TM-78302 June 1978
SCATS — SRB Cost Accounting and Tracking System Handbook. Ross B. Zorn, Rodney D. Stewart, Gary Coley, and Marie Higginbotham. Systems Analysis and Integration Laboratory and Computer Services Office. N79-27002

This technical memorandum describes the Solid Rocket Booster Cost Accounting and Tracking System (SCATS) which is an automatic data processing system designed

to keep a running account of the number, description, and estimated cost of Level II, III, and IV changes. Although designed specifically for the Space Shuttle Solid Rocket Booster Program, the ADP system can be used for any other program that has a similar structure for recording, reporting, and summing numbers and costs of changes. The program stores the alpha-numeric designators for changes, government estimated costs, proposed costs, and negotiated value in a MIRADS (Marshall Information Retrieval and Display System) format which permits rapid access, manipulation, and reporting of current change status. Output reports listing all changes, totals of each level, and totals of all levels, can be derived for any calendar interval period.

TM-78303 June 1979
Apollo Telescope Mount — A Partial Listing of Scientific Publications and Presentations, Supplement 3. Edited by John M. Reynolds, Stanley A. Fields, and William C. Snoddy. Space Sciences Laboratory.
N79-27500

This report supplements NASA TM X-73300, NASA TM X-73393, and NASA TM-78183. These reports are compilations of bibliographies from the principal investigator groups of the Apollo Telescope Mount (Skylab solar observatory facility) that gathered data from May 28, 1973, to February 8, 1974. The analysis of these data is presently under way and is expected to continue for several years.

The publications listed in this report are divided into the following categories: (1) Journal Publications, (2) Journal Publications Submitted, (3) Other Publications, (4) Presentations — National and International Meetings, and (5) Other Presentations. An author index is included together with errata for previous reports.

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TM-78304

July 1980

Self-Replicating Systems - A Systems Engineering Approach. Georg von Tiesenhausen and Wesley A. Darbro. Program Development and Space Sciences Laboratory. N80-34209

This study develops a first approach to conceptualize self-replicating systems from past and present abstract theories. The engineering elements of Self-Replicating Systems are defined in terms of a basic reference system. A number of options are investigated. The growth characteristics and their problems are analyzed, the mathematics of various exponential growth options are outlined, and the problems of universal parts production and systems closure are discussed. Selected areas of further study are defined and a 20-year development and demonstration program is presented.

TM-78305

August 1980

Characterization of Three Types of Silicon Solar Cells for SEPS Deep Space Missions. A. F. Whitaker, S. A. Little, V. A. Wooden, D. E. Carter, B. E. Cothren, and C. A. Torstenson. Materials and Processes Laboratory. N80-33863

Three types of high performance silicon solar cells, sculptured BSR/P⁺ (K7), BSR/P⁺ (K6.5) and BSR (K4.5) manufactured by Spectrolab have been evaluated for their low temperature and low intensity performance. Sixteen cells of each type were subjected to 11 temperatures and 9 intensities. The sculptured BSR/P⁺ (K7) cells provided the greatest maximum power output both at 1 AU and at LTLI conditions. The average efficiencies of this cell were 14.4% at 1 SC/+25°C and 18.5% at 0.086 SC/-100°C.

TM-78306

August 1980

Space Environmental Effects on Materials. R. J. Schwinghamer. Materials and Processes Laboratory. N81-10085

The Space Shuttle will provide a low cost delivery system for Earth orbital payloads by amortizing launch costs through system reusability. This development paves the way for large platforms and structures in space. But successful design of long life platforms and structures for space use requires due consideration of space environmental effects on the materials used. Large space system materials, especially those in geosynchronous Earth orbit (GEO), will be subjected to vacuum, ultraviolet radiation and charged particle radiation which will influence the performance and functional lifetime of the systems. This report describes research oriented toward the acquisition of long term environmental effects data needed to support the design and development of large low Earth orbit (LEO) and GEO space platforms and systems for the next decade.

TM-78307

October 1980

Dynamic Testing of Large Space Structures. R. Ryan, R. Jewell, F. Bugg, W. Ivey, R. McComas, L. Kieffling, and J. Jones. Systems Dynamics Laboratory.

Structural dynamicists are faced with basically an unsolvable problem: the prediction and verification of an analytical structural dynamic model to prescribed accuracy for use in control, loads, pogo, and aeroelastic design verification analysis. These verifications are accomplished through static and dynamic structural tests. This report deals with the subject of state-of-the-art dynamic testing, using as examples testing accomplished on the Space Shuttle and its elements. General conclusions on testing approaches are discussed, as well as future technology requirements.

TM-78308*

November 1980

Skylab Orbital Lifetime Prediction and Decay Analysis. P. E. Dreher, R. P. Little, and G. Wittenstein. Systems Analysis and Integration Laboratory.

N81-13979

*See notation page 20.

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This report provides a record (from pre-flight planning to earth impact) of Skylab's orbital lifetime predictions, its actual decay, and analysis thereof. Skylab provided a unique opportunity to develop, confirm and check out procedures and computer programs used for predicting lifetime and reentry. It provided verification of aerodynamic and environment which had been predicted for several aerodynamic configurations. It also provided data on the density model's reaction to rapidly changing solar flux over relatively short time periods. The effects of solar flux (and the uncertainty in the solar flux predictions) on orbital lifetime are discussed.

TM-78309 October 1980
Space Transportation System Solid Rocket Booster Thrust Vector Control System. Adas J. Verble, Jr., Alex A. McCool, and Jack H. Potter. Structures and Propulsion Laboratory.

N81-11105

The Solid Rocket Booster, Thrust Vector Control (TVC) system was designed in accordance with the following requirements: self-contained power supply, fail-safe operation, 20 flight uses after exposure to seawater landings, optimized cost, and component interchangeability. Trade studies were performed which led to the selection of a recirculating hydraulic system powered by Auxiliary Power Units (APU) which drive the hydraulic actuators and gimbal the solid rocket motor nozzle. Other approaches for the system design were studied in arriving at the recirculating hydraulic system powered by an APU. These systems must withstand the imposed environment and be usable for a minimum of 20 Space Transportation System flights with a minimum of refurbishment. The TVC system has completed the required qualification and verification tests and is certified for the intended application. Substantiation data will include analytical and test data.

TM-78310 October 1980
Pilot Signals for Large Active Retro-Directive Arrays. C. H. Chan. NASA/ASEE Summer Fellowship Program. N81-10238

It has been suggested that for large active retrodirective arrays, as in the solar power system, a two-tone uplink pilot signal with frequencies symmetrically situated around the downlink frequency be used in order to reduce ionospheric biases and to lower the cost since a two-tone receiver is economically much cheaper than a single-tone phase-locked receiver. Unfortunately such a system now faces the following well-known difficulties: (i) the π -ambiguity, (ii) a large phase difference between the downlink and uplink signals.

We show in this report how the π -ambiguity can be easily removed by using a two-tone uplink signal with both frequencies situated at one side of the downlink frequency, and the phase difference can be greatly reduced with a three-tone or a four-tone uplink pilot signal.

TM-78311 October 1980
Electrical Torques on the Electrostatic Gyro in the Gyro Relativity Experiment. Peter Eby and Wesley Darbro. Space Sciences Laboratory. N81-10344

This report presents a comprehensive discussion and calculation of electrical torques on an electrostatic gyro as they relate to the Gyroscope Experiment to test General Relativity. Drift rates are computed for some typical state-of-the-art rotors, including higher harmonics in the rotor shape. The effect of orbital averaging of gravity gradient forces, roll averaging of torques, and the effect of spin averaging on the effective shape of the rotor are considered. The basic conclusion is that the electrical torques are reduced sufficiently in a low-g environment to permit a measurement of the relativistic drifts predicted by General Relativity.

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TM-78312 November 5, 1973
The Mathematical Model Development
for the MSFC Skylab Man-in-the-Loop
Docking Simulator. N81-70790

The equations used to drive the Skylab man-in-the-loop docking simulation of MSFC's Comp Lab facility are developed. These include models of the docking contact-capture-latch forces and torques, CMG/TACS and RCS control models, target motion simulator equations, and gravity gradient torques. These equations are currently implemented in the docking simulator which has been and continues to be used in support of Skylab missions. Most noteworthy in this development is the use of a method of "soft constraints" which allows real time simulation of docking impacts on the EAI8900 Hybrid Computer System.

TM-78313 October 1980
FY 1980 Scientific and Technical
Reports, Articles, Papers, and Presentations. Compiled by O. L. White, Management Services Office. N81-28036

This document presents formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY 80. It also includes papers of MSFC contractors.

After being announced in STAR, all of the NASA series reports may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

The information in this report may be of value to the scientific and engineering community in determining what information has been published and what is available.

TM-78314 November 1980
A Preliminary Look at AVE-SESAME
IV Conducted on 9-10 May 1979.

Michael J. July and Robert E. Turner.
Space Sciences Laboratory. N81-14552

This report contains information on data collected, synoptic conditions, and severe and unusual weather reported during the AVE-SESAME IV period. The information is preliminary. The purpose of the report is to provide to researchers a preliminary look at conditions during the AVE-SESAME IV period.

TM-78315 November 1980
AVE-SESAME IV: 25 mb Sounding
Data. Meta E. Sienkiewicz, Luke P.
Gilchrist, and Robert E. Turner. Space
Sciences Laboratory. N81-14553

This report describes the rawinsonde sounding program for the AVE-SESAME IV experiment and presents tabulated data at 25 mb for the 23 National Weather Service and 20 special stations participating in the experiment. Soundings were taken at 3-hr intervals beginning at 1200 GMT on May 9, 1979, and ending at 1200 GMT on May 10, 1979 (nine sounding times). The method of processing is discussed briefly, estimates of the rms errors in the data are presented, and an example of contact data is given. Reasons are given for the termination of soundings below 100 mb, and soundings are listed which exhibit abnormal characteristics.

TM-78316 November 1980
Theoretical Regime Diagrams for Thermally Driven Flows in a Beta-Plane Channel in the Presence of Variable Gravity. J. E. Geisler and W. W. Fowlis.
Space Sciences Laboratory. N81-12676

The effect of a power law gravity field on baroclinic instability is examined, with a focus on the case of inverse fifth power gravity, since this is the power law produced when terrestrial gravity is simulated in

spherical geometry by a dielectric force. Growth rates are obtained of unstable normal modes as a function of parameters of the problem by solving a second-order differential equation numerically. Results are compared with those from an earlier study in which gravity was a constant. It is concluded that over the range of parameter space explored here, there is no significant change in the character of theoretical regime diagrams if the vertically averaged gravity is used as parameter.

TM-78317

December 1980

The Swept Angle Retarding Ion Mass Spectrometer - Initial Results from the Michigan Auroral Probe Sounding Rocket. D. L. Reasoner, C. R. Chappell, N. H. Stone, W. E. Sharp, and J. H. Hoffman. Space Sciences Laboratory.

N81-14530

Data from a sounding rocket flight of the Swept Angle Retarding Ion Mass Spectrometer (SARIMS) are presented to demonstrate the capability of the instrument to make measurements of thermal ions which are differential in angle, energy, and mass. The SARIMS was flown on the Michigan Auroral Probe (MAP) over regions characterized first by discrete auroral arcs and later by diffuse precipitation. The instrument measured the temperature, densities, and flow velocities of the ions NO^+ and O^+ . Measured NO^+ densities ranged from 10^5 up to 3×10^5 ions/cm³, while the measured O^+ densities were a factor of 5-10 less. Ion temperatures ranged from 0.15 up to 0.33 eV. Eastward ion flows of approximately 0.5 km/sec were measured near the arcs, and the observed flow magnitude decreased markedly inside the arcs.

TM-82389

January 1981

Space Shuttle Solid Rocket Booster Recovery Subsystem. Roy E. Runkle. Structures and Propulsion Laboratory.

N81-13990

The design and testing of the Space Shuttle Solid Rocket Booster (SRB) Recovery Subsystem (RSS) posed some unique challenges. The Recovery System components (parachutes, suspension lines, risers, reefing lines, etc.) were of gargantuan dimensions when compared with existing parachutes, such as personnel parachutes or cargo-recovery parachutes. The SRB RSS parachutes were designed to deploy in a severe (200-220 pounds/in.² air pressure) environment and safely lower to earth an 85-ton rocket motor casing.

Severe development schedule and funding limitations required dedicated and innovative thinking from a small team of government and contractor personnel. This report describes the studies and the development and testing program that led to a successful design and delivery of all flight hardware to Kennedy Space Center, Florida, on schedule.

TM-82390

January 1981

Steering Law for Parallel Mounted Double-Gimbaled Control Moment Gyros - Revision A. H. F. Kennel. Systems Dynamics Laboratory.

N81-13991

Mounting of double-gimbaled control moment gyros (CMG's) of unlimited outer gimbal angle freedom with all their outer gimbal axes parallel allows drastic simplification of the CMG steering law development in the redundancy management and failure accommodation and in the mounting hardware. The advantages of the parallel mounting for the CMG steering law development are such that a law could be developed which is applicable to any number of CMG's with arbitrary angular momentum. Parallel mounting of the CMG's in conjunction with the steering law can therefore be considered a "CMG kit" suitable for many missions of differing momentum requirements. It also means that increasing momentum demands

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during the design phase of a space vehicle can be easily met by the addition of one or more CMG's of the original momentum capacity rather than a redesign to a larger momentum capacity. Another advantage of the parallel mounting is that the failure of any CMG can be treated like any other, i.e., only one failure mode is possible. The CMG steering law distributes the CMG momentum vectors such that all inner gimbal angles are equal which reduces the rate requirements on the outer gimbal axes. The steering law also spreads the outer gimbals which ensures avoidance of singularities internal to the angular momentum envelope.

This report is an extensive revision of Reference 1 to the extent that a different outer gimbal angle distribution function is used, significantly reducing the software requirements.

TM-82391 January 1981
An Evaluation of Grease Type Ball Bearing Lubricants Operating in Various Environments (Status Report No. 5).
E. L. McMurtrey. Materials and Processes Laboratory. N81-16475

Because many future spacecraft or space stations will require mechanisms to operate for longer periods of time in environments which are adverse to most bearing lubricants, a series of tests is continuing to evaluate 38 grease type lubricants in R-4 size bearings in five different environments for a 1-year period. Four repetitions of each test are made to provide statistical samples. These tests have also been used to select four lubricants for 5-year tests in selected environments with five repetitions of each test for statistical samples. At the present time, 100 test sets have been completed and 22 test sets are underway. Three 5-year tests have already been started in (1) continuous and (2) start-stop operation, with both in vacuum at ambient temperatures, and (3) continuous operation at 93.3 °C. To

date, in the 1-year tests, the best results in all environments have been obtained with a high viscosity index perfluoroalkylpolyether (PFPE) grease.

TM-82392 January 1981
An Extended Classical Solution of the Droplet Growth Problem. B. Jeffrey Anderson, John Hallett, and Maurice Beesley. Space Sciences Laboratory. N81-17383

Problems of applying the classical kinetic theory to the growth of small droplets from the vapor are examined. A solution for the droplet growth equation is derived which is based on the assumption of a diffusive field extending to the drop surface. The method accounts for partial thermal and mass accommodation at the interface and the kinetic limit to the mass and heat fluxes, and it avoids introducing the artifact of a discontinuity in the thermal and vapor field near the droplet. Consideration of the environmental fields in spherical geometry utilizing directional fluxes yields boundary values in terms of known parameters and a new Laplace transform integral. Different initial assumption coupled with this method yield various solutions derived by earlier workers. The solution is applicable to drop sizes both larger and smaller than the mean free path.

TM-82393 January 1981
Seacoast Stress Corrosion Cracking of Aluminum Alloys. T. S. Humphries and E. E. Nelson. Materials and Processes Laboratory. N81-18164

An investigation of the stress corrosion cracking resistance of high strength, wrought aluminum alloys in a seacoast atmosphere is presented, and the results are compared with those obtained in laboratory tests. Round tensile specimens taken from the short transverse grain direction of aluminum plate and

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stressed up to 100 percent of their yield strengths were exposed to the seacoast at Kennedy Space Center and to alternate immersion in salt water and synthetic seawater. Maximum exposure periods of one year at the seacoast, 0.3 or 0.7 of a month for alternate immersion in salt water, and three months for synthetic seawater are indicated for aluminum alloys to avoid false indications of stress corrosion cracking failure resulting from pitting. Correlation of the test results was very good among the three test media using the selected exposure periods. Therefore, either of the laboratory test media is suitable for evaluating the stress corrosion cracking performance of aluminum alloys in seacoast atmosphere.

TM-82394 January 1981
The Pyroelectric Properties of TGS for Application in Infrared Detection. R. L. Kroes and D. Reiss. Space Sciences Laboratory. N81-18852

This report describes the pyroelectric property of triglycine sulfate (TGS) and its application in the detection of infrared radiation. The detectivities of pyroelectric detectors and other types of infrared detectors are compared. The thermal response of a pyroelectric detector element and the resulting electrical response are derived in terms of the material parameters. The noise sources which limit the sensitivity of pyroelectric detectors are described, and the noise equivalent power for each noise source is given as a function of frequency and detector area.

TM-82395** January 1981
Development and Testing of Heat Transport Fluids For Use In Active Solar Heating And Cooling Systems -- Final Report. John C. Parker. Solar Energy Applications Projects Office. N81-16584

This document summarizes the final results of contract NAS8-32255 with Houston

Chemical Company, Corpus Christi, Texas, for the additional development work on heat transport fluids for use with active solar heating and cooling systems. It discusses the intended use of the final report, describes the deliverable end items, lists program objectives, relates how they were accomplished and deals with problems encountered during testing.

The report shows that a certain product tested is marketable and is recommended as being suitable for public use.

TM-82396 January 1981
Postflight Analysis of The Single-Axis Acoustic System on SPAR VI and Recommendations for Future Flights. R. J. Naumann, W. A. Oran, Roy R. Whymark, and Charles Rey. Space Sciences Laboratory. N81-18860

This report presents the postflight analysis of the single-axis acoustic levitator that was flown on SPAR VI in October 1979. The apparatus malfunctioned. The results of a series of tests, analyses, and investigation of hypotheses that were undertaken to determine the probable cause of failure are presented, together with recommendations for future flights of the apparatus.

The most probable causes of the SPAR VI failure were (1) lower than expected sound intensity due to mechanical degradation of the sound source and (2) an unexpected external force that caused the experiment sample to move radially and eventually be lost from the acoustic energy well.

TM-82397 January 1981
AVE-SESAME VI: 25-mb Sounding Data. Meta E. Sienkiewicz, Luke P. Gilchrist, and Robert E. Turner. Space Sciences Laboratory. N81-18607

This report describes the rawinsonde sounding program for the AVE-SESAME VI

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experiment and presents tabulated data at 25-mb intervals from the surface to 25 mb for the 23 National Weather Service and 15 special stations participating in the experiment. Soundings were taken at 3-h intervals beginning at 1200 GMT on June 7, 1979, and ending at 1200 GMT on June 8, 1979 (nine sounding times). The method of processing is discussed briefly, estimates of the rms errors in the data presented, an example of contact data given, reasons given for the termination of soundings below 100 mb, and soundings listed which exhibit abnormal characteristics.

TM-82398 January 1981
A Preliminary Look at AVE-SESAME VI Conducted on 7-8 June 1979.
Michael July and Robert E. Turner.
Space Sciences Laboratory.
N81-18896

This report contains information on data collected, synoptic conditions, and severe and unusual weather reported during the AVE-SESAME VI period. The purpose of the report is to provide to researchers a preliminary look at conditions during the AVE-SESAME VI period, 7-8 June 1979.

TM-82399 January 1981
Susceptibility Measurements on the Superconducting Properties of Nb-Ge Alloys. Thomas J. Rathz. Space Sciences Laboratory.
N81-18893

A susceptibility apparatus to measure superconducting properties of samples made in the MSFC Drop Tube has been used to measure the transition temperature (T_c) and susceptibilities of Nb and Nb-Ge Alloys prepared in bulk spherical (2-4 diameter) form using a 32 m drop tube in which containerless low-gravity solidification could take place. Results indicate that a drop tube processing environment was beneficial for increasing the T_c of the superconducting

phase of the material over that of arc-melted material. The increase in T_c is found to be related to the amount of solidification of the total sample that took place before reaching the bottom of the drop tube. In-phase and quadrature-phase measurements of the specimen's susceptibility indicated that some improvement in homogeneity takes place in drop tube processing. These phase measurements also indicated little or no shielding of a lower T_c phase by a higher T_c filamentary structure.

TM-82400 January 1981
IECM Calibration and Data Reduction Requirements. Fred D. Wills and Charles W. Davis. Space Sciences Laboratory.
N81-18569

The Induced Environment Contamination Monitor (IECM) tape recorder format, as it relates to the output of meaningful data from the IECM instrument, is explained in this report. Eight-bit words (or bytes) generate numbers that represent voltage levels of electronic detection probes for each experiment. This information is amalgamated by the IECM Data Acquisition and Control System (DACS). In some cases bits represent certain status situations concerning an experiment, such as whether a valve is opened or closed. Voltages are transformed into meaningful physical phenomena through equations of calibration. Data formats and plots are generated as requested for each IECM experimenter.

TM-82401 January 1981
Equilibrium and Stability of a Satellite Influenced by Gravitational and Aerodynamic Torques. Zachary J. Galaboff. Systems Dynamics Laboratory.
N81-18078

Equilibrium and stability of a satellite influenced by gravitational and aerodynamic torques are investigated. A circular orbit and

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constant atmospheric density are assumed. Presented is a computer program which determines equilibrium attitudes and the associated eigenvalues of these attitudes. Demonstration of the use of this program is made using the former Skylab satellite as an example.

TM-82402 February 1981
Evaluation of Several Corrosion Protective Coating Systems on Aluminum.
R. H. Higgins, Materials and Processes Laboratory.
N81-19274

A study of several protective coating systems for use on aluminum in seawater/seacoast environments has been conducted. This study was conducted to review the developments that have been made on protective coatings since early in the Space Shuttle program and to perform comparative studies on these coatings to determine their effectiveness for providing corrosion protection during exposure to seawater/seacoast environments. Panels of 2219-T87 aluminum were coated with 21 different systems and exposed to a 5 percent salt spray for 4000 hr. Application properties, adhesion measurements, heat resistance and corrosion protection were evaluated. For comparative studies, the presently specified Bostik epoxy system used on the SRB structures was included. Results of these tests indicate four systems with outstanding performance and four additional systems with protection almost as good. These systems are based on a chromated pretreatment, a chromate epoxy primer, and a polyurethane topcoat. Consideration for one of these systems should be included for those applications where superior corrosion protection for aluminum surfaces is required.

TM-82403 March 1981
Viscoelastic Propellant Effects on Space Shuttle Dynamics. Frank Bugg, Systems Dynamics Laboratory.
N81-20289

An extensive program of solid propellant research has been conducted to support the Space Shuttle Dynamics modeling effort. The research is discussed in three parts. The first describes studies performed to define characteristics of the propellant itself, i.e., the stiffness, damping, compressibility, and the effects of many variables on these properties. The second concerns the relationship between the propellant and SRB dynamics, such as effects of propellant stiffness on free-free SRB modes. The third deals with coupled modes of the Shuttle system and the effects of propellant stiffness on SRB/ET interfaces.

TM-82404 March 1981
Weld Geometry Strength Effect in 2219-T87 Aluminum. A. C. Nunes, Jr., H. L. Novak, and M. C. McIlwain, Materials and Processes Laboratory.
N81-21172

A theory of the effect of geometry on the mechanical properties of a butt weld joint is worked out based upon the soft interlayer weld model. Tensile tests of 45 TIG butt welds and 6 EB beads-on-plate in 1/4-in. 2219-T87 aluminum plate made under a wide range of heat sink and power input conditions are analyzed using this theory. The analysis indicates that purely geometrical effects dominate in determining variations in weld joint strength with heat sink and power input. Variations in weld dimensions with cooling rate are significant as well as with power input. Weld size is suggested as a better indicator of the condition of a weld joint than energy input.

TM-82405 February 1981
The MSFC Vector Magnetograph. M. J. Hagyard, N. P. Cumings, and E. A. West, Space Sciences Laboratory.

The NASA/Marshall Space Flight Center's solar vector magnetograph system is

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described; this system allows measurements of all components of the Sun's photospheric magnetic field over a 5×5 or 2.5×2.5 arc min square field of view with an optimum time resolution of approximately 100 sec and an optimum signal-to-noise of approximately 1000. The basic system components are described, including the optics, detector, digital system, and associated electronics. Automatic sequencing and control functions are outlined as well as manual selections of system parameters which afford unique system flexibility. Results of system calibration and performance are presented, including linearity, dynamic range, uniformity, spatial and spectral resolutions, signal-to-noise, electro-optical retardation and polarization calibration.

TM-82406 March 1981
Performance of Photomultiplier Tubes and Sodium Iodide Scintillation Detector Systems. Charles A. Meegan, Space Sciences Laboratory. N81-21280

The performance of photomultiplier tubes (PMT's) and scintillation detector systems incorporating 50.8 by 1.27 cm NaI (Tl) crystals was investigated. The purpose of the investigation was to determine the characteristics of the photomultiplier tubes and optimize the detector geometry for the Burst and Transient Source Experiment (BATSE) on the Gamma Ray Observatory (GRO). This report provides background information on performance characteristics of PMT's and NaI (Tl) detectors, specifies procedures for measurement of relevant parameters, and presents results of these measurements.

TM-82407 March 1981
The Passive Optical Sample Assembly (POSA) on STS-1. Roger C. Linton, Space Sciences Laboratory. N81-20868

The Passive Optical Sample Assembly

(POSA), scheduled for flight on Orbital Flight Test 1 (OFT-1), is an instrument to aid in the assessment of contamination hazards to sensitive payloads in the Shuttle cargo bay. It consists of an array of passively deployed samples mounted on the Development Flight Instrumentation (DFI) pallet in the Shuttle cargo bay. This report describes the POSA hardware, the directory of samples together with their intended measurements, and the plan for POSA data analysis.

TM-82408 March 1981
Development of Urethane Coating and Potting Material with Improved Hydrolytic and Oxidative Stability. Donald E. Morris, Materials and Processes Laboratory. N81-22192

A series of saturated hydrocarbon-based urethanes was prepared and characterized for hydrolytic and oxidative stability. A series of ether-based urethanes was used as a basis for comparison. The alkane-based urethanes were found to be hydrolytically and oxidatively stable, and had excellent electrical properties. The alkane-based materials absorbed little or no water and were reversion-resistant. There was little loss in hardness or weight when exposed to high temperature and humidity. Dielectric properties were excellent and suffered little adverse effects from the high temperature/humidity conditions. The alkane-based urethanes were not degraded by ozone exposure.

TM-82409 March 1981
Considerations on Repeated Repairing of Weldments in Inconel 718 Alloy. E. O. Bayless, C. V. Lovoy, M. C. McIlwain, and P. Munafò, Materials and Processes Laboratory. N81-21171

This report presents the results of a study to determine the effects of repeated weld repairs on the metallurgical characteristics, high cycle fatigue (HCF), and tensile properties of Inconel 718 butt weld joints.

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The study employed 1/4-in. and 1/2-in. thick plates, tungsten inert gas (TIG) welding, and Inconel 718 filler wire. Weld panels were subjected to 2, 6, and 12 repeated repairs and were made in a highly restrained condition. Post weld heat treatments were also conducted with the welded panel in the highly restrained condition.

The study concluded that no significant metallurgical anomaly was evident as a result of up to twelve repeated weld repairs. No degradation in fatigue life was noted for up to twelve repeated repairs. Tensile results from specimens which contained up to twelve repeated weld repairs revealed no significant degradation in UTS and YS. However, a significant decrease in elongation was evident with specimens (solution treated and age-hardened after welding) which contained twelve repeated repairs. The elongation loss was attributed to the presence of a severe notch on each side (fusion line) of the repair weld bead reinforcement. Basically, the weld joint tends to peak more and more with each successive repeated weld repair but, due to a combination of an increase in back-side metal drop through and distortion restraint during repeated repairing, the peak projection develops as a shallow notch on each side of the weld repair. This study shows that the severity of these notches increases with increasing numbers of repeated repairs.

TM-82410 April 1981
Materials Processing in Space (MPS)
Program Description. N81-22065

The intent of this document is to provide a brief insight into the scientific rationale of MPS, and to describe a comprehensive and cohesive approach for implementation and integration of the many, diverse aspects of MPS.

The programmatic and management functions are intended to apply to all projects

and activities implemented under MPS. It is intended, further, that specific project plans, providing project unique details, will be appended to this document for major endeavors such as the Space Processing Applications Rocket (SPAR) Project, the Materials Experiment Assembly (MEA) Project, the MPS/Spacelab (MPS/SL) Project, and the Materials Experiment Carrier (MEC) Payloads.

The MEC development is expected to be an Office of Space Transportation Systems (OSTS) budgeted project, done in conjunction with the Office of Space and Terrestrial Applications (OSTA) and managed by the MPS Projects Office at Marshall Space Flight Center (MSFC); a separate project plan with joint OSTS/OSTA approval is anticipated for that project.

TM-82411 April 1981
Chemical Etching for Automatic Processing of Integrated Circuits. Bobby W. Kennedy. Electronics and Control Laboratory. N81-74978

This report presents a discussion of Chemical Etching for automatic processing of integrated circuits including the wafer carrier and loading from a receiving air track into automatic furnaces and unloading onto a sending air track.

TM-82412 April 1981
Low Drag Attitude Control for Skylab Orbital Lifetime Extension. John R. Glaese and Hans F. Kennel. Systems Dynamics Laboratory. N81-22074

In the fall of 1977 it was determined that Skylab had started to tumble and that the original orbit lifetime predictions were much too optimistic. A decision had to be made whether to accept an early uncontrolled reentry with its inherent risks or try to attempt to control Skylab to a lower drag attitude in the hope that there was enough

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time to develop a Teleoperator Retrieval System, bring it up on the Space Shuttle and then decide whether to boost Skylab to a higher longer life orbit or to reenter it in a controlled fashion.

In the following the end-on-velocity (EOVV) control method is documented, which was successfully applied for about half a year to keep Skylab in a low-drag attitude with the aid of the control moment gyros and a minimal expenditure of attitude control gas.

TM-82413 March 1981
The Pinhole/Occulter Facility. H. S.
Hudson, J. L. Kohl, R. P. Lin, R. M.
MacQueen, E. Tandberg-Hanssen, and
J. R. Dabbs. Space Sciences Laboratory.
N81-22895

A large occulting system in space can be used for high-resolution X-ray observations and for large-aperture coronagraphic observations in visible and UV light. The X-ray observations will combine high angular resolution in hard (>10 keV) X-radiation with the high sensitivity of a multiple-pinhole camera, and will permit sensitive observations of bremsstrahlung from nonthermal particles in the corona. The large-aperture coronagraphs have two major advantages: high angular resolution and good photon collection. This will permit observations of small-scale structures in the corona for the first time and will give sufficient counting rates above the coronal background rates for sensitive diagnostic analysis of intensities and line profiles for coronal structures in the solar wind acceleration region.

This document describes the technical basis for performing observations with a large occulting system in these three wavelength ranges. A preliminary description of a Pin-hole/Occulter Facility presently being considered for Spacelab is given, together with some indications about future developments.

TM-82414 **April 1981**
Solar Energy Absorption Characteristics and The Effects of Heat On The Optical Properties of Several Coatings. J. R. Lowery. Materials and Processes Laboratory.
N81-22474

This study was conducted to determine the solar energy absorption characteristics of several high-temperature coatings and to evaluate the effects of heat on these coatings. Included in the investigation were an electroplated alloy of black chrome and vanadium, electroplated black chrome, and chemically colored 316 stainless steel. The results of this study showed that each of the coatings possessed good selective solar energy absorption properties at laboratory ambient temperature. Measured at a temperature of 700°K (800°F), the emmittances of black chrome, black chrome-vanadium, and colored stainless steel were 0.11, 0.61, and 0.15, respectively. Black chrome and black chrome-vanadium did not degrade optically in the presence of high heat [811°K (1000°F)]. Chemically colored stainless steel showed slight optical degradation when exposed to moderately high heat [616°K (650°F)], but showed more severe degradation at exposure temperatures beyond this level. Each of the coatings showed good corrosion resistance to a salt-spray environment.

TM-82415** April 1981
Development And Testing Of Thermal
Energy Storage Modules For Use In
Active Solar Heating and Cooling Sys-
tems — Final Report. John C. Parker.
Solar Energy Applications Projects
Office. N81-23604

This document summarizes the final results of contract NAS8-32254 with Artech Corporation, Falls Church, Virginia, for the additional development work on thermal energy storage modules for use with active solar heating and cooling systems. It discusses the intended use of the final report.

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describes the deliverable end items, lists program objectives, relates how they were accomplished and deals with problems encountered and their solutions.

The report shows that the product developed and tested is marketable and is recommended as being suitable for public use.

TM-82416 May 1981
A Preliminary Look at AVE-SESAME V
Conducted on 20-21 May 1979, Michael
J. July and Robert E. Turner. Space
Sciences Laboratory. N81-24680

This report contains information on data collected, synoptic conditions, and severe and unusual weather reported during the AVE-SESAME V period. The information is preliminary. The purpose of the report is to provide to researchers a preliminary look at conditions during the AVE-SESAME V period.

TM-82417 May 1981
AVE-SESAME V: 25-mb Sounding Data.
Meta E. Sienkiewicz, Luke P. Gilchrist,
and Robert E. Turner. Space Sciences
Laboratory. N81-24651

This report describes the rawinsonde sounding program for the AVE-SESAME V experiment and presents tabulated data at 25-mb intervals for the 23 National Weather Service stations and 20 special stations participating in the experiment. Soundings were taken at 3-hr intervals beginning at 1200 GMT on May 20, 1979, and ending at 1200 GMT on May 21, 1979 (nine sounding times). A tenth sounding was taken at many special stations between 2100 and 0000 GMT on May 20. The method of processing is discussed briefly, estimates of the rms errors in the data are presented, and an example of contact data is given. Reasons are given for

the termination of soundings below 100 mb, and soundings with abnormal characteristics are listed.

TM-82418 April 1981
The Retarding Ion Mass Spectrometer
on Dynamics Explorer-A. C. R.
Chappell, S. A. Fields, C. R. Baugher,
J. H. Hoffman, W. B. Hanson, W. W.
Wright, H. D. Hammack, C. R. Carignan,
and A. F. Nagy. Space Sciences Labora-
tory. N81-24908

The Retarding Ion Mass Spectrometer (RIMS) for Dynamics Explorer-A is an instrument designed to measure the details of the thermal plasma distribution. It combines the ion temperature-determining capability of the retarding potential analyzer with the compositional capabilities of the mass spectrometer and adds multiple sensor heads to sample all directions relative to the spacecraft ram direction. This report describes the RIMS, its operational modes, the instrument calibration, the data reduction plan, and the anticipated results.

TM-82419 May 1981
Project Resource Reallocation Algor-
ithm. J. E. Myers. Cost Analysis Office.
N81-25861

Project schedules are an important parameter in industrial-engineering-type man-hour and material cost estimates. An existing computer tool (PACE-Pricing and Cost Estimating) generates a cost estimate from resource estimates by Work Breakdown Structure (WBS) and element-of-cost based on a specific project schedule. Project schedules often change, requiring some methodology for adjusting baseline cost estimates. An algorithm has been developed and is described herein which performs a linear expansion or contraction of the baseline project resource distribution in proportion to the project

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schedule expansion or contraction. Input to the algorithm consists of the deck of cards (PACE input data) prepared for the baseline project schedule as well as a specification of the nature of the baseline schedule change. Output of the algorithm is a new deck of cards with all WBS block and element-of-cost estimates redistributed for the new project schedule. This new deck can be processed through PACE to produce a detailed cost estimate for the new schedule.

TM-82420

April 1981

Emergency Relief Venting of the Infrared Telescope Liquid Helium Dewar -- Second Edition. Eugene W. Urban, Space Sciences Laboratory. N81-24302

An updated analysis is made of the emergency relief venting of the liquid helium dewar of the Spacelab 2 Infrared Telescope experiment in the event of a massive failure of the dewar guard vacuum. Such a failure, resulting from a major accident, could cause rapid heating and pressurization of the liquid helium in the dewar and lead to relief venting through the emergency relief system. This report estimates the heat input from an accident for various fluid conditions in the dewar and considers the relief process as it takes place through one or both of the emergency relief paths. In the original edition of this report it was assumed that the burst diaphragms in the dewar relief paths would rupture at a pressure of 65 psi differential or 4.4 atmospheres. A detailed analysis of this case was performed, and the results constitute the major portion of this revised report. It has, in fact, proved necessary to use burst diaphragms in the dewar which rupture at 115 psid or 7.8 atmospheres. An analysis of this case has been carried out and shows that when the high pressure diaphragm rupture occurs, the dewar pressure falls within 8 s to below the 4.4 atmospheres for which the original analysis was performed, and thereafter it remains below that level. It is, therefore, shown that under all reasonable circumstances the dewar will safely relieve

itself.

This report supersedes NASA TM-78271, March 1980, and should be used in place of it.

TM-82421

June 1, 1981

Passive Optical Sample Assembly (POSA) for STS-1 -- Quick-Look Post-mission Report. Roger C. Linton and Edgar R. Miller. Space Sciences Laboratory. N81-24161

The Passive Optical Sample Assembly (POSA) is a passively deployed array of contamination-sensitive samples. A POSA unit was mounted and flown in the cargo bay of the Space Shuttle Columbia during the first Orbital Flight Test (OFT-1). A similar unit was mounted in a different location in the cargo bay at Dryden Flight Research Center during the postflight operations there prior to the ferry flight return of Columbia to Kennedy Space Center.

The samples in both POSA arrays were subjected to a series of optical and analytical measurements prior to delivery for installation in the cargo bay and after retrieval of the flight hardware. This report presents a quick-look summary of the results of a comparison of the two series of measurements. A more detailed analysis will be provided later in a separate publication.

TM-82422

April 1981

Payload Operations Control Center (POCC) Timeline Analysis Program. Dr. David L. Shipman, Steven R. Neman, and E. Steven Terry. Systems Analysis and Integration Laboratory. N81-24845

This document is a user's manual for the operation of the Payload Operations Control Center (POCC) Timeline Analysis Program which is used to provide POCC activity and resource information as a function of mission time. This program is fully

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automated and interactive, and is equipped with tutorial displays. The tutorial displays are sufficiently detailed for use by a program analyst having no computer experience. The POCC Timeline Analysis Program is designed to operate on the VAX/VMS version V2.1 computer system.

TM-82423 **May 1981**
Undercooling Measurement in a Low-Gravity Containerless Environment.
Michael B. Robinson. Space Sciences Laboratory. **N81-25092**

This report describes a technique for measuring the amount of undercooling for samples processed in a low-gravity containerless environment. The time of undercooling is determined by measuring the time of cooling before nucleation and recalescence by two infrared detectors. Once the cooling curve for each drop is calculated, the amount of undercooling can then be found. The technique is demonstrated by measuring the amount of undercooling for drops of pure niobium and select compositions of the niobium-germanium alloy system while free falling in a 32 m evacuated drop tube.

Before undercooling curves for the niobium-germanium alloy drops could be calculated, it was necessary to measure the total hemispherical emissivities and specific heats for these materials because there is a total absence of such thermophysical properties in the literature. These properties were measured using a high-temperature containerless calorimeter. Also, a brief overview of the effect of undercooling on drops of niobium and niobium-germanium is given.

TM-82424

October 1980

Lox/Gox Related Failures During Space Shuttle Main Engine Development.

C. E. Cataldo. Materials and Processes Laboratory.

N81-27192

Specific rocket engine hardware and test facility system failures are described which were caused by high pressure liquid and/or gaseous oxygen reactions. The failures described were encountered during the development and testing of the Space Shuttle Main Engine. Failure mechanisms are discussed as well as corrective actions taken to prevent or reduce the potential of future failures.

TM-82425 **July 1981**
Materials Processing in Space: A Survey
of Refereed Open Literature Publica-
tions, Compiled by E. Pentecost. Space
Sciences Laboratory. N81-28112

This document is a bibliography by year of the research published in the open literature by the workers in the Materials Processing in Space program. This work was sponsored by NASA, either directly or indirectly, and generally pertains to the influence (or lack of influence) of gravity on processes involved in crystal growth, solidification, fluid transport, containerless phenomena, and various separation techniques of interest to the biomedical community. Also included are studies of the possibilities of using the high vacuum in the wake of orbiting vehicles for performing processes involving large heat loads and evolution of gases.

TM-82426 **June 1981**
Corrosion Fatigue of Inconel 718 and
Incoloy 903. D. B. Franklin and E. E.
Nelson. N81-28232

Corrosion fatigue tests were conducted on Inconel 718 and Incoloy 903 in distilled water, 500 ppm NaCl, and 3.5% NaCl. Results were compared to the endurance limit in air. For Inconel 718, the Corrosion Fatigue Strength (CFS) in 3.5% NaCl was 338 MPa (49 ksi) or 75 percent of the endurance limit. For Incoloy 903, the CFS ranged from 234

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MPa (34 ksi) in distilled water (68 percent of the endurance limit) to 103 MPa (15 ksi) in 3.5% of NaCl (30 percent of the endurance limit). These results indicate that, for components which have limited fatigue life, an evaluation of the combined effects of fatigue and the corrosive atmosphere must be considered in projecting useful lifetimes.

TM-82427 **July 1981**
Survey of The U. S. Materials Processing and Manufacturing in Space Program. E. C. McKannan, Materials Processing in Space Projects Office. **N81-27150**

The primary motivation of the program is to use the unique environments of space for scientific and commercial applications. The elimination of the Earth's gravity during the production of common materials affords opportunities for understanding and improving ground-based methods or, where practical and economical, producing select materials in space. Large factories or mills producing huge quantities of materials, as is often the case on Earth, are not expected in space in the near future. Materials that might be produced in space, typically, would be of low-volume but of high-value commercial interest.

TM-82428 **May 1981**
Fracture Analysis of HPOTP Bearing Balls. Biliyar N. Bhat, Materials and Processes Laboratory. **N81-28442**

This report presents the fracture analysis conducted on four HPOTP (High Pressure Oxygen Turbopump) bearing balls from the SSME (Space Shuttle Main Engine). Non-destructive evaluation, optical microscopy, and transmission microscopy techniques were used in the analysis. The results showed that the cracks are initiated at or close to the ball surface under conditions of high cyclic stresses and high coefficient of friction. The cracks lead to spalls and subsequent crack

propagation seems to occur by fatigue mode under concentrated loading of cyclic nature.

TM-82429 **June 1981**
An Investigation of Assembly and Performance of A Resistoflex Dynatube 1/4 Inch Fitting. J. H. Ehl, Materials and Processes Laboratory.

Installation of Resistoflex dynatube fittings on 1/4 in. tubing is sensitive to workmanship and to the state of repair of the installation tooling. Tooling with very slight out-of-specification imperfections will produce less than optimum swaged fittings. This investigation included fabrication of a significant quantity of samples, X-rays to determine the depth of swage and static and dynamic testing to determine joint performance.

TM-82430 **July 8, 1981**
Software Control Program for 25 kW Breadboard Testing. J. A. Pajek. **N81-30814**

A data acquisition software program has been developed to operate in conjunction with the automated control system of the 25 kW PM EPS Breadboard Test Facility. The program provides limited interactive control of the Breadboard Test while acquiring data and monitoring parameters, allowing unattended continuous operation.

The Breadboard Test facility has two positions for operating separate configurations. A block diagram of a typical test configuration is shown in Fig. 1. The main variable in each test setup is the high voltage battery. The initial test battery contains 112, 33 AH, NI-CD cells each. The second test battery contains 88, 55 AH, NI-CD cells arranged in four modules of 22 cells each. Current testing will be limited to using a 28 vdc load bus, but the capability for testing

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with a high voltage bus (110 v DC or higher) has been included in the facility and equipment design.

TM-82431 April 1981
Evaluation of Anti-Freeze Viscosity Modifier for Potential External Tank Applications. Robert O. L. Lynn. Materials and Processes Laboratory. N81-30169

Viscosity modifiers and gelling agents have been evaluated in combination with ethylene glycol and dimethyl sulfoxide water eutectics. Pectin and agarose were found to gel these autectics effectively in low concentration, but the anti-freeze protection afforded by these compositions was found to be marginal in simulations of the intended applications. Oxygen vent shutters and vertical metallic surfaces were simulated, with water supplied as a spray, dropwise, and by condensation from the air.

TM-82432 May 1981
Atmospheric Observations for STS-1 Landing. Robert E. Turner, James E. Arnold, and Gregory S. Wilson. Space Sciences Laboratory. N81-30740

A summary of synoptic weather conditions existing over the western United States is given for the time of Shuttle descent into Edwards Air Force Base, California. The techniques and methods used to furnish synoptic atmospheric data at the surface and aloft for flight verification of the STS-1 Orbiter during its descent into Edwards Air Force Base are specified. Examples of the upper-level data set are given.

TM-82433* May 1981
Space Processing Applications Rocket Project, SPAR VI Final Report. Compiled by R. Chassay.

The Space Processing Applications Rocket Project (SPAR) VI Final Report contains the compilation of the postflight reports of each of the principal investigators of the four selected science payloads, in addition to the engineering report as documented by the Marshall Space Flight Center (MSFC). This combined effort also describes pertinent portions of ground-based research leading to the ultimate selection of the flight sample composition, including design, fabrication and testing, all of which are expected to contribute immeasurably to an improved comprehension of containerless processing in space.

The SPAR project is coordinated and managed by MSFC as part of the Materials Processing in Space (MPS) program of the Office of Space and Terrestrial Applications (OSTA) of NASA Headquarters.

This technical memorandum is directed entirely to the payload manifest flown in the sixth of a series of SPAR flights conducted at the White Sands Missile Range (WSMR) and includes the experiments entitled "Containerless Processing of Glass," "Epitaxial Growth of Single Crystal Films," "Containerless Processing Technology," and "Directional Solidification of Magnetic Composites."

TM-82434 July 1981
Doppler-Cancelled Response to VLF Gravitational Waves. Alessandro Caporali. Space Sciences Laboratory. N81-29311

This report discusses the interaction of long periodic gravitational waves with a three-link microwave system known as the Doppler Cancelling System. This system, which was developed for a gravitational redshift experiment, uses on-way and two-way

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Doppler information to construct the beat signal of two reference oscillators moving with respect to each other. The geometric optics approximation is used to derive the frequency shift produced on a light signal propagating in a gravitational wave space-time. The signature left on the Doppler-cancelled beat by bursts and continuous gravitational waves is analyzed. A comparison is made between the response to gravitational waves of the Doppler Cancelling System and that of a (NASA) Doppler tracking system which employs two-way, round-trip radio waves. A three-fold repetition of the gravitational wave form is found to be a common feature of the response functions of both systems. These two functions otherwise exhibit interesting differences.

TM-82435

August 1981

Accommodations Analysis: Spaceborne Doppler Lidar Wind Measuring System.

This technical memorandum summarizes an accommodations analysis performed by the MSFC Preliminary Design Office for a spaceborne doppler lidar wind measuring system. A dedicated, free-flying spacecraft design concept is described. Mass and beginning-of-life power requirements are estimated at 2260 kg and 6.0 - 8.5 kW, respectively, to support a pulsed, CO₂, doppler lidar having a pulse energy of 10 J, pulse rate of 8 Hz, and efficiency of approximately 5%. Under the assumptions of the analysis, such a system would provide wind measurements on a global scale, with accuracies of a few meters per second.

TM-82436

July 1981

Atmospheric Environment for Space Shuttle (STS-1) Launch. D. L. Johnson, G. Jasper, and S. C. Brown. Space Sciences Laboratory.

This report presents a summary of selected atmospheric conditions observed near

Space Shuttle STS-1 launch time on April 12, 1981, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch biosphere measured vertical wind profiles is given in this report. Also presented are the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area. Final meteorological data tapes for STS-1 vehicle ascent and SRB descent have been constructed which consist of wind and thermodynamic parameters versus altitude. The STS-1 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 989-13-22-368 with Johnson Space Center.

TM-82437

August 1981

Holographic Microscopy Studies of Emulsions. William K. Witherow. Space Sciences Laboratory. N81-30212

A holographic microscopy system that will record and observe the dynamic properties of separation in dispersed immiscible fluids is described in detail. This report briefly reviews the requirements of holography. The holographic construction system and reconstruction system that were used to obtain particle sizes and distribution information from the holograms are also described.

The holographic microscopy system is then used to observe the phase separating processes in immiscible fluids that have been isothermally cooled into the two-phase region. Nucleation, growth rates, coalescence, and particle motion are successfully demonstrated with this system. Thus, a holographic particle sizing system with a resolution of 2 μm and a field of view of 100 cm^3 has been developed that will provide the capability of testing the theories of separating immiscible fluids for particle number densities in the range of 10 to 10⁷ particles/cm³.

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TM-82438

June 1981

Toward A Space Materials Systems Program, Georg F. von Tiesenhausen, Advanced Systems Office.

A program implementation model is presented which covers the early stages of space material processing and manufacturing. The model includes descriptions of major program elements, development and experiment requirements in space materials processing and manufacturing, and an integration of the model into NASA's long range plans as well as its evolution from present Materials Processing in Space plans.

TM-82439

August 1981

Solid Rocket Booster Thrust Vector Control -- V-2 Off-Nominal Testing. Boris Pagan, Structures and Propulsion Laboratory.

This report presents the results of the V-2 off-nominal test sequence performed on the Space Shuttle solid rocket booster thrust vector control (SRB TVC) subsystem by the Marshall Space Flight Center, Huntsville, Alabama. These tests were performed between September 1979 and July 1980, per paragraph 10, SE-019-098-2H, SRB TVC Overall Systems Test Requirements.

A discussion of the overall TVC subsystem performance is presented. In addition, test objectives, detail results, and data are included for general information.

TM-82440

September 1981

MSFC Evaluation of the Space Fabrication Demonstration System (Beam Builder). E. O. Adams and C. N. Irvine, Materials and Processes Laboratory.

The Grumman/MSFC beam builder, designed and manufactured as a ground demonstration model, is a precursor to a machine for use in the space environment,

transportable by the Space Shuttle. The ultimate purpose is to provide the capability to automatically fabricate triangular truss beams in low Earth orbit with a highly reliable machine that requires a minimum of in-space maintenance and repair. This report provides a performance assessment of the beam builder, which was fabricated under contract NAS8-32472 from commercial hardware.

TM-82441

August 1981

Vector Wind Profile Gust Model. S. I. Adelfang and O. E. Smith, Space Sciences Laboratory.

This report summarizes results from a study which had the objective of developing a vector wind gust model that is suitable for orbital flight test operations and trade studies. Emphasis is given to verification of the hypothesis that gust component variables are gamma distributed, gust modulus is approximately Weibull distributed, and zonal and meridional gust components are bivariate gamma distributed. A method of testing for bivariate gamma distributed variables is described, two distributions for gust modulus are described, the results of extensive hypothesis testing of one of the distributions are presented, and the validity of the gamma distribution for representation of gust component variables is established.

TM-82442**

September 25, 1981

Solar Cooling System Performance, Frenchman's Reef Hotel, St. Thomas, U. S. Virgin Islands -- Final Report. Harry Harber.

This report is a part of the Solar Heating and Cooling Development Program funded by the Department of Energy and is one of a series of reports describing the operational and thermal performance of a variety of solar systems installed in Operational Test Sites.

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The Solar Cooling System installed in the Frenchman's Reef Resort Hotel Test Site, St. Thomas, U. S. Virgin Islands, used 956 Sunmaster Corporation evacuated glass tube collector modules which provide an effective solar collector aperture of 13,384 square feet. The system consists of the collectors, two 2500 gallon tanks, pumps, an Andover Controls Corporation computerized controller, a large solar optimized Carrier Corporation industrial sized lithium bromide absorption chiller, and associated plumbing. Solar heated water is pumped through the system to the designed public areas such as lobby, lounges, restaurant and hallways. Auxiliary heat is provided by steam and heat exchanger to supplement the solar heat.

TM-82443

1981

Materials Processing in Space Program Tasks. Compiled by E. Pentecost. Space Sciences Laboratory.

This report is a compilation of the active research tasks as of the end of fiscal year 1981 of the Materials Processing in Space

Program, NASA Office of Space and Terrestrial Applications, involving several NASA Centers and other organizations. The purpose of this document is to provide an overview of the program scope for managers and scientists in industry, university, and government communities. The report is structured to include an introductory description of the program, its history, strategy and overall goal; identification of the organizational structures and people involved; and a description of each research task together with a list of recent publications.

The tasks are grouped into four categories: Crystal Growth; Solidification of Metals, Alloys, and Composites; Fluids, Transports, and Chemical Processes, and Ultrahigh Vacuum and Containerless Processing Technologies. In many cases a task is placed in more than one category. For example, studies involving fluid dynamics of crystal growth were entered in both Crystal Growth and Fluids, Transports, and Chemical Processes. This insures complete coverage of each category.

*Blue cover reports printed at Langley.

**DOE/NASA reports.

TP-1873

May 1981

Life Test of a Nickel Cadmium Battery With a Protection/Reconditioning Circuit. John R. Lanier, Jr., and John R. Bush, Jr. Electronics and Control Laboratory. N81-24167

This report discusses the results of a Ni-Cd battery test over a period of 8 years, 2 months and 44,213 simulated low earth orbits. The battery cells were protected against overdischarge and reversal at discharge rates up to 25 amperes (1.25C) by a battery protection and reconditioning circuit (BPRC). The circuit performed flawlessly during the test, and proved its value, both as a battery reconditioner and a cell protection device. Battery cell failures are also discussed. The test demonstrated the viability of using Ni-Cd batteries at depths-of-discharge up to 25 percent for over 5 years in a low Earth orbit.

TP-1900

August 1981

Development of a Silane-Hydrolysate Binder for UV-Resistant Thermal Control Coatings. W. J. Patterson. Materials and Processes Laboratory.

Detailed characterization and formulation studies have been performed on a methyltriakoxysilane hydrolysate as a binder for thermal control coatings. The binder was optimized by varying hydrolysis temperature, time, catalyst type, and water concentration. The candidate coating formulations, based on this binder with TiO_2 pigment, were optimized via a detailed series of sprayed test panels that included the parameters of binder/pigment ratio, ethanol content, pigment particle size, coating thickness and cure conditions. A typical optimized coating was prepared by acetic acid-catalyzed hydrolysis of methyltriethoxysilane with 3.25 mol-equivalents of water over a 24 hour period at room temperature. The resulting hydrolysate was directly mixed with pre-milled TiO_2) 12

grams pigment/26 grams binder) to yield a sprayable consistency. Panels were sprayed to result in a nominal cured coating thickness of 2 mils. Cure was affected by air drying for 24 hr at room temperature plus 72 hr at 150°F . These coatings are typically extremely tough and abrasion-resistant, with an absorptance (α) of 0.20 and emittance (ϵ) of 0.89. No significant coating damage was observed in the mandrel bend test, even after exposure to thermal cycling from -160° to 160°F . Vacuum exposure of the coatings for 930 hours at 1 equivalent UV sun resulted in no visible degradation and no significant increase in absorptance.

TP-1912

September 1981

Feasibility Study of LITVC for Shuttle SRB. C. L. Martin and L. B. Powers. Structures and Propulsion Laboratory.

This report presents an analysis of a Liquid Injection Thrust Vector Control (LITVC) system for the Shuttle Solid Rocket Booster (SRB). A performance analysis which compares LITVC with the SRB baseline flexible seal is followed by a table of LITVC advantages and disadvantages.

The analysis concludes that LITVC does not look attractive for use on the SRBs at the present time because of the high duty cycle requirements and the cost and effort associated with implementing a major complex system.

TP-1925

September 1981

Avenues and Incentives for Commercial Use of a Low-Gravity Environment. Richard L. Brown and Lowell K. Zoller. Materials Processing in Space Projects Office.

One of the unique and new technologies which have emerged from the space program is the processing of materials in a low-gravity

(low-g) or microgravity (10^{-6} g to 10^{-2} g) environment. The reduction or elimination of the pervasive influences of gravity on process mechanisms affords opportunities for understanding and improving ground-based processes and for creating unique materials. The primary goal of NASA's present work in the field is to realize scientific and commercial utilization of the low-g environment for materials research and for process and product development. For the next several years, any products of commercial interest which necessitate processing in space will probably be low volume, high value items. To encourage the commercialization of materials processing in low-g, NASA, in parallel with establishing and demonstrating the scientific/technological precepts for analyzing and using a low-g environment, is establishing the legal and management mechanisms to share in the cost and risk of early commercial ventures, and is now working with commercial firms on a case-by-case basis to explore applications of this new technology to specific needs of the company.

TP-1932 July 1981
Space Shuttle Main Engine Controller.
Russell M. Mattox and Dr. J. B. White.
Data Systems Laboratory.

A technical description of the Space Shuttle Main Engine Controller which provides engine checkout prior to launch, engine control and monitoring during launch, and engine safing and monitoring in orbit, is presented. Each of the major controller sub-assemblies, the central processing unit, the computer interface electronics, the input electronics, the output electronics, and the power supplies are described and discussed in detail along with engine and orbiter interfaces and operational requirements.

The controller represents a unique application of digital concepts, techniques, and technology in monitoring, managing, and

controlling a high performance rocket engine propulsion system. The operational requirements placed on the controller, the extremely harsh operating environment to which it is exposed, and the reliability demanded, result in the most complex and ruggedized digital system ever designed, fabricated, and flown.

TP-1933 June 1981
The Aerodynamics of Bodies in a Rarefied Ionized Gas with Applications to Spacecraft Environmental Dynamics.
Nobie H. Stone. Space Sciences Laboratory.

This study consists of two parts: an experimental parametric investigation and an in-depth critical review of knowledge in the field derived from previous experimental investigations, theoretical treatments, and ionospheric satellite data. The objectives are to provide a parametric description of the electrostatic interaction of a mesosonic, collisionless plasma with conducting bodies on the order of 1 to 10 Debye lengths in size, and to extend this description to the satellite-ionospheric interaction, where possible.

New experimental findings include: (1) converging ion streams in the near wake whose inclination to the wake axis and crossing point location depend on Φ_b and $[SR_d^{0.24}/|\Phi_b|^{1/2}]$, respectively, where Φ_b is the normalized body potential, S , the ion acoustic Mach number, and R_d , the Debye ratio; (2) that two mechanisms with different Φ_b dependences create the mid-wake axial ion peak whose maximum amplitude and width depend on $[S/|\Phi_b|^{1/2}]$ and $|\Phi_b|^{-1/2}$, respectively; (3) the morphology and amplitude of the axial ion peak depend on the geometry of the plasma sheath, which varies with thickness (and therefore R_d and Φ_b) for bodies with square cross sections, but is independent of thickness for spherical and long cylindrical bodies; (4) the wake of the geometrically complex body appears to be a

linear superposition of the wakes of its simple geometric components; (5) previously observed electron heating may be explained by a wave-particle interaction resulting from a two-stream instability produced by fast, plasma stream ions passing through slow, charge exchange ions; and (6) vector ion flux measurements show converging ion streams at the wake axis and direct evidence of ion streams deflected from the wake axis by the positive space charge potential associated with the axial ion peak.

The extension to the satellite-ionospheric interaction utilizes qualitative scaling and indicates that similar, but smaller amplitude, wake structures may be expected for small or highly charged bodies. However, for large bodies at small potentials, the structure may be diffused by the thermal ion motion and the dispersion resulting for space charge potentials.

TP-1939

August 1981

Concept for a Power System Controller for Large Space Electrical Power Systems. Louis F. Lollar, John R. Lanier, Jr., and James R. Graves. Prepared by Electronics and Control Laboratory, Science and Engineering.

A need for autonomous control of large electrical power systems has emerged. A Marshall Space Flight Center Director's Discretionary Fund task is undertaken to develop technology for a fail-operational Power System Controller (PSC) utilizing microprocessor technology for managing the distribution and power processor subsystems of a large multi-kW space Electrical Power System. The task involved determining the specific functions which must be performed by the PSC, determining the best microprocessor available to do the job, and determining the feasibility, cost savings, and applications of a PSC. A limited function breadboard version of a PSC was developed to demonstrate the concept and potential cost savings.

NASA REFERENCE PUBLICATIONS

RP-1070 January 1981
A Comparative Analysis of Rawinsonde and Nimbus 6 and Tiros N Satellite Profile Data, James R. Scoggins, William E. Carle, Keith Knight, Vance Moyer, and Nine-Min Cheng. U. S. Army Research Office granted permission for NASA publication. N81-15640

RP-1071 January 1981
Atmospheric Structure Determined from Satellite Data, Keith Shelburne Knight and James R. Scoggins. U. S. Army Research Office granted permission for NASA publication. N81-16678

RP-1072 January 1981
Determination of Wind from Nimbus 6 Satellite Sounding Data, William E.

Carle and James R. Scoggins. U. S. Army Research Office has granted permission for NASA publication. N81-15639

RP-1073 January 1981
Comparisons Between Nimbus 6 Satellite and Rawinsonde Soundings for Several Geographical Areas, Nine-Min Cheng and James R. Scoggins. U. S. Army Research Office granted permission for NASA publication. N81-16679

RP-1074 February 1981
Preliminary Vibration, Acoustic, and Shock Design and Test Criteria for Components on the Lightweight External Tank (LWT). Systems Dynamics Laboratory. N81-19218

NASA CONFERENCE PUBLICATIONS

CP-2179 **December 1980**
Float Zone Workshop, Edited by R. J.
Naumann, Space Sciences Laboratory.
N81-19144

CP-2181 **May 1981**
15th Aerospace Mechanisms Symposi-
um. Marshall Space Flight Center.
N81-22388

CP-2186 **June 1981**
Capacitor Technologies, Applications
and Reliability. Marshall Space Flight
Center. N81-26156

CP-2199 **August 1981**
Proceedings of the Workshop on Spacecraft Dynamics as Related to Laboratory Experiments in Space. Marshall Space Flight Center.

CP-2200 Sept. 1ber 1981
**Proceedings of the Scientific Review
 Meeting of the Numerical Studies Pro-
 gram for the Atmospheric General Cir-
 culation Experiment (AGCE) for Space-
 lab Flights, Marshall Space Flight Center.**

CP-2204 September 1981
NASA/MSFC FY-81 Atmospheric Pro-
cesses Research Review. Space Sciences
Laboratory.

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- CR-3336** November 1980
Kinetic Energy Budgets in Areas of Intense Convection. Henry E. Fuelberg, Emil M. Berecek, David M. Ebel, and Gary J. Jedlovac, NAS8-33370. Department of Earth and Atmospheric Sciences, Saint Louis University. N81-11612
- CR-3337** November 1980
Effect of Lateral Spacing on Wake Characteristics of Buildings. Earl Logan, Jr., and David S. Barber. NAS8-32357. College of Engineering and Applied Sciences, Arizona State University. N81-10635
- CR-3338** November 1980
Solid State SPS Microwave Generation and Transmission Study, Volume I -- Phase II Final Report. Owen E. Maynard. NAS8-33157. Raytheon Company. N81-11458
- CR-3339** November 1980
Solid State SPS Microwave Generation and Transmission Study, Volume II -- Phase II Final Report Appendices. Owen E. Maynard. NAS8-33157. Raytheon Company. N81-13469
- CR-3342** November 1980
Pilot-Aircraft System Response to Wind Shear. Barry S. Turkel and Walter Frost. NAS8-33458. FWG Associates, Inc. N81-10636
- CR-3344** November 1980
Electrostatic Protection of the Solar Power Satellite and Rectenna, Part I: Protection of the Solar Power Satellite. NAS8-33023. Rice University. N81-11459
- CR-3345** November 1980
Electrostatic Protection of the Solar Power Satellite and Rectenna -- Part II: Lightning Protection of the Rectenna. NAS8-33023. Rice University. N81-10526
- CR-3346** November 1980
Satellite Power Systems (SPS) Laser Studies, Volume I: Laser Environmental Impact Study. R. E. Beverly III. NAS8-32475. Rockwell International. N81-10527
- CR-3347** November 1980
Satellite Power Systems (SPS) Laser Studies, Vol. 2: Meteorological Effects on Laser Beam Propagation and Direct Solar Pumped Lasers for the SPS. R. E. Beverly III. NAS8-32475. Rockwell International. N81-12560
- CR-3348** November 1980
Solar Power Satellite Offshore Rectenna Study. NAS8-33023. Rice University. N81-12558
- CR-3349** November 1980
Satellite Power System Salvage and Disposal Alternatives. NAS8-33783. ECON, Incorporated. N81-11456
- CR-3350** November 1980
Satellite Power System (SPS) Antenna Pointing Control. NAS8-33604. The University of Tennessee. N81-14392
- CR-3365** April 1981
Development of Experimental Concepts for Investigating the Strength Behavior of Fine-Grained Cohesive Soil in the Spacelab/Space Shuttle Zero-G Environment. Rudolph Bonaparte and James K. Mitchell. NAS8-33449. Department of Civil Engineering, University of California, Berkeley. N81-22439
- CR-3366** January 1981
Statistical Analysis of Atmospheric Turbulence About a Simulated Block

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Building. Sidney L. Steely, Jr., and Walter Frost. NAS8-32692. The University of Tennessee Space Institute. N81-16686
- CR-3370** January 1981
A Study of Crystal Growth by Solution Technique. R. B. Lal. NSG-8033. Department of Physics, Alabama Agricultural and Mechanical University. N81-15872
- CR-3372** January 1981
High Accuracy Radiation Efficiency Measurement Techniques. D. J. Kozakoff and J. M. Schuchardt. NAS8-33605. Georgia Institute of Technology. N81-15459
- CR-3374** January 1981
Guide Star Probabilities. Raymond M. Soneira and John N. Bahcall. NAS8-32902. Institute for Advanced Study. N81-15913
- CR-3375** February 1981
Satellite Power Systems (SPS) - LSST Systems Analysis and Integration Task for SPS Flight Test Article. H. S. Greenberg. NAS8-32475. Rockwell International. N81-19564
- CR-3377** August 1981
Chromospheric and Photospheric Evolution of an Extremely Active Solar Region in Solar Cycle 19. Susan M. P. McKenna-Lawlor. H-12261B. St. Patrick's College.
- CR-3378** January 1981
Case Studies of Clear Air Turbulence Using the Diagnostic Richardson Number Tendency Formulation. John L. Keller and Patrick A. Haines. NAS8-32111. University of Dayton Research Institute. N81-16680
- CR-3379** January 1981
An Airport Wind Shear Detection and Warning System Using Doppler Radar - A Feasibility Study. John McCarthy, Edward F. Blick, and Kim L. Elmore. NAS8-33458. MCS, Incorporated. N81-16681
- CR-3383** February 1981
Satellite Power System (SPS) Magnetron Tube Assessment Study. William C. Brown. NAS8-33157. Raytheon Company. N81-18490
- CR-3384** January 1981
Zero-Gravity Aerosol Behavior. Harry W. Edwards. NAS8-31673. Colorado State University. N81-16682
- CR-3386** February 1981
The Development of Convective Instability, Wind Shear, and Vertical Motion in Relation to Convective Activity and Synoptic Systems in AVE IV. James G. Davis and James R. Scoggins. NAS8-31773. Texas A&M University. N81-18604
- CR-3392** March 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D), Volume I - Executive Summary. G. M. Hanley. NAS8-32475. Rockwell International. N81-19562
- CR-3393** March 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D), Volume II - Systems/Subsystems Analyses. G. M. Hanley. NAS8-32475. Rockwell International. N81-21491
- CR-3394** March 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D), Volume III - Transportation Analysis. G. M.

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Hanley, NAS8-32475, Rockwell International. N81-19565
- CR-3395 March 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D), Volume IV - Operations Analyses. G. M. Hanley, NAS8-32475, Rockwell International. N81-19566
- CR-3396 March 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D), Volume V - Systems Engineering/Integration Research and Technology. G. M. Hanley, NAS8-32475, Rockwell International. N81-22469
- CR-3397 March 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D), Volume VI, Part 1 - Cost and Programmatic. G. M. Hanley, NAS8-32475, Rockwell International. N81-20537
- CR-3398 March 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D), Volume VI, Part 2 - Cost and Programmatic Appendix. NAS8-32475, Rockwell International. N81-21492
- CR-3399 March 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D), Volume VII - Systems/Subsystems Requirements Databook. G. M. Hanley, NAS8-32475, Rockwell International. N81-23595
- CR-3400 April 1981
Satellite Power Systems (SPS) Concept Definition Study (Exhibit D) - Solid-State Amplifier Investigation. G. M. Hanley, NAS8-32475, Rockwell International. N81-21534
- CR-3401 April 1981
Analysis of the Inversion Monitoring Capabilities of a Monostatic Acoustic Radar in Complex Terrain. David Koepf and Walter Frost. NAS8-32031. The University of Tennessee Space Institute. N81-20664
- CR-3407 April 1981
Small-Angle Approximation to the Transfer of Narrow Laser Beams in Anisotropic Scattering Media. Michael A. Box and Adarsh Deepak. NAS8-33135. Institute for Atmospheric Optics and Remote Sensing. N81-21905
- CR-3419 May 1981
Ionospheric Observation of Enhanced Convection-Initiated Gravity Waves During Tornadoic Storms. R. J. Hung. NAS8-31171. The University of Alabama in Huntsville. N81-23760
- CR-3430 June 1981
Numerical Solutions of Atmospheric Flow Over Semielliptical Simulated Hills. Chih Fang Shieh and Walter Frost. NAS8-32692. The University of Tennessee Space Institute. N81-24678
- CR-3431 June 1981
Airplane Wind Vibrations Due to Atmospheric Turbulence. Robert L. Pastel, John E. Caruthers, and Walter Frost. NAS8-32692. The University of Tennessee Space Institute. N81-24679
- CR-3440 June 1981
Charged Particle Concepts for Fog Dispersion. Walter Frost, Frank G. Collins, and David Koepf. NAS8-33541. FWG Associates, Incorporated. N81-26644
- CR-3456 August 1981
A Subsynchronous-Scale Kinetic Energy

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Study of the Red River Valley Tornado Outbreak (AVE-SESAME I). Gary J. Jedlovac and Henry E. Fuelberg. NAS8-33370. Saint Louis University.
- CR-3480** June 2, 1981
Feasibility Study of a Procedure to Detect and Warn of Low-Level Wind Shear. Barry S. Turkel, Philip A. Kessel, and Walter Frost. NAS8-33457. FWG Associates, Incorporated.
- CR-3481** August 7, 1981
Design of Prototype Charged Particle Fog Dispersal Unit. Frank G. Collins, Walter Frost, and Philip Kessel. NAS8-33541. FWG Associates, Incorporated.
- CR-161558**** September 1980
Design Package for Solar Domestic Hot Water System. NAS8-32245. Elcam, Inc. N80-33867
- CR-161559**** September 1980
Solar Hot Water System Installed at Day's Lodge, Atlanta, GA. DOE Contract EG-77-G-01-1632. Day's Inn of America. N81-10519
- CR-161560**** September 1980
Solar Hot Water System Installed at Day's Inn Motel, Jacksonville, FL. DOE Contract EG-77-G-01-1632. N81-10523
- CR-161561**** September 1980
Solar Hot Water System Installed at Day's Inn Motel, Savannah, GA. DOE Contract EG-77-01-1632. Day's Inn of America. N81-10522
- CR-161562**** October 1980
Installation Package for Solar Domestic Hot Water System. NAS8-32245. Elcam, Inc. N80-33866
- CR-161563** July 31, 1980
Orbit Transfer Vehicle Engine Study, Final Report, Volume I, Executive Summary. NAS8-33444. Pratt & Whitney Aircraft Group. N80-32431
- CR-161564** July 31, 1980
Orbital Transfer Vehicle Engine Study, Final Report, Volume II, Technical Report. NAS8-33444. Pratt & Whitney Aircraft Group. N80-32432
- CR-161565** March 5, 1980
Space Transportation System Disconnect, Final Report. NAS8-32806. Fairchild Stratos Division. N80-31442
- CR-161566** July 1980
Numerical Simulation of Advection Fog Formation on Multi-Disperse Aerosols Due to Combustion-Related Pollutants, Final Technical Report. NAS8-31729. University of Alabama in Huntsville. N80-31971
- CR-161567** September 12, 1980
Pinhole X-Ray/Coronagraph Optical Systems Concept Definition Study, Final Report. NAS8-33697. Visidyne, Inc. N80-32208
- CR-161568** December 9, 1980
Duplicate of NASA CR-161555.
- CR-161569**** September 1980
Solar Hot Water System Installed at Day's Inn Motel, Dallas, TX (Forrest Lane). DOE Contract EG-77-01-1632. Day's Inn of America. N81-10524
- CR-161570**** September 1980
Solar Hot Water System Installed at Day's Inn Motel, Dallas, TX (Valley View). DOE Contract EG-77-G-01-1632. Day's Inn of America. N81-10521

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- CR-161571 September 30, 1980
Space Fabrication Demonstration Sys-
tem, Quarterly Progress Report No. 13.
NAS8-32472, Grumman Aerospace
Corp. N80-90636
- CR-161572 June 1980
Windfield Retrieval from Doppler Lidar
Observations, Interim Technical Report
No. 1. NAS8-33389. Lassen Research.
 N80-33123
- CR-161573 September 10, 1980
Dual Nozzle Aerodynamic and Cooling
Analysis Study, Bimonthly Progress
Report No. 11. NAS8-33553. Aerojet
Liquid Rocket Co. N80-32433
- CR-161574 July 31, 1980
Orbit Transfer Vehicle Engine Study,
Final Report, Volume III, Program
Costs. NAS8-33444, Pratt & Whitney
Aircraft Group. N80-32433
- CR-161575 1980
Accelerated Life Testing Effects on
CMOS Microcircuit Characteristics, Final
Report Covering May 1976 to December
1979. NAS8-31905. RCA Solid State
Div. N80-32653
- CR-161576 September 1980
Statistical Energy Analysis of Complex
Structures, Phase II -- Final Report.
NAS8-33191, McDonnell Douglas Astro-
nautics Co. N80-32752
- CR-161577 August 1980
Manufacturing Process Applications
Team (MATEam), 2nd Quarterly Report
for 1980. NAS8-32229. IIT Research
Institute. N80-33313
- CR-161578 August 31, 1980
SOS-II User's Manual. NAS8-33382.
Intermetrics, Inc. N81-70258
- CR-161579 July 3, 1980
Sun Series Program for the REEDA
System, Final Report. NAS8-33814.
Atsuko Computing International.
 N80-34327
- CR-161580 March 6, 1980
Numerical Study of Baroclinic Insta-
bility, Final Report. NAS8-33558, Uni-
versity of Miami. N80-33992
- CR-161581 September 10, 1980
SUMC Fault Tolerant Computer System,
Final Report. NAS8-31747. IBM Corp.
 N80-34111
- CR-161582 September 1980
Research in Cloud Microphysical Pro-
cesses Related to Ice, Fog, and Cloud
Production and Development, Final
Report. NAS8-32611. University of
Tennessee Space Institute. N81-90247
- CR-161583 July 1979
Camera/Photometer, Final Report.
NAS8-32235. Epsilon Laboratories, Inc.
 X80-10257
- CR-161584 August 1980
Investigation of Electrodynamic Stabili-
zation and Control of Long Orbiting
Tethers, Interim Report for 1 March
1980 through 31 August 1980. NAS8-
33691. Smithsonian Institution Astro-
physical Observatory. N80-33748
- CR-161585 October 8, 1980
Evaluation and Prediction of Long Term
Space Environmental Effects on Non-
Metallic Materials, Quarterly Progress
Report No. 4. NAS8-33578. Martin
Marietta Corp. N80-33479
- CR-161586** October 1980
Solar Heating System Installed at Jack-
son, Tennessee -- Final Report. DOE

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Contract FG-77-A-01-4092. Energy Solutions, Inc. N81-73511
- CR-161587** October 1980
Solar Hot Water System Installed at Mobile, Alabama — Final Report. DOE Contract 77-G-01-1523. LaQuinta Motor Inns, Inc. N81-13461
- CR-161588** September 1980
Solar Heating System Installed at Troy Ohio — Final Report. DOE Contract EX-76-C-01-2375. Troy-Miami County Public Library. N81-12545
- CR-161589** September 1980
Solar Heating and Cooling System Installed at Columbus, Ohio. DOE Contract EG-77-A-01-090. Columbus Technical Institute. N81-12544
- CR-161590** September 1980
Solar Heat Transport Fluids for Solar Energy Collection Systems (A Collection of Quarterly Reports). NAS8-32255. Houston Chemical Co.
- CR-161591 September 30, 1980
Shuttle/Payload Contamination Evaluation Program, Version II, the Space II Computer Program, User's Manual, Final Report. NAS8-32980. Martin Marietta Aerospace. N81-70784
- CR-161592 October 1980
Coal Conversion Products Industrial Applications, Final Report. NAS8-34029. Technology Development Corp. N81-75226
- CR-161593 October 1980
Advanced Oxygen-Hydrocarbon Rocket Engine Study, Bi-Monthly Progress Report No. 6. NAS8-33452. Aerojet Liquid Rocket Co. N81-90042
- CR-161594 September 26, 1980
Low Thrust Concept Study, Final Report for Task 7. NAS8-33527. General Dynamics Convair Division. N81-11101
- CR-161595** November 1980
Solar Heating, Cooling, and Domestic Hot Water System Installed at Kaw Valley State Bank and Trust Company, Topeka, Kansas — Final Report. DOE Contract EG-77-A-01-4030. N81-14393
- CR-161596 October 1980
Analysis of Space Telescope Data Collection System, Interim Final Report Covering July 1, 1979 to October 31, 1980. NAS8-33570. Mississippi State University. N81-11967
- CR-161597 September 1980
Geostationary Platform Systems Concepts Definition Study, Follow-On Study, Final Report, Volume IIA-Technical (Task 11 LSST Special Emphasis). NAS8-33527. General Dynamics, Convair Division. N81-12133
- CR-161598 July 5, 1980
Advanced Methods for Preparation and Characterization of Infrared Detector Materials, Final Report. NAS8-33107. McDonnell Douglas Research Laboratories. N81-20863
- CR-161599 January 1975
Concept Definition and System Analysis Study for a Solar Electric Propulsion Stage, Volume I, Executive Summary (Final Report). NAS8-30921. Boeing Aerospace Co. N81-70336
- CR-161600 January 1975
Concept Definition and System Analysis

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Study for a Solar Electric Propulsion Stage, Volume II, Mission and System Analysis, Final Report. NAS8-30921. Boeing Aerospace Co. N81-71119
- CR-161601 January 1975
Concept Definition and System Analysis Study for a Solar Electric Propulsion Stage, Volume III, Configuration and Subsystem Design and Analysis, Final Report. NAS8-30921. Boeing Aerospace Co. N81-70792
- CR-161602 January 1975
Concept Definition and System Analysis Study for a Solar Electric Propulsion Stage, Volume VI, Systems Requirements Data Book, Final Report. NAS8-30921. Boeing Aerospace Co. N81-71120
- CR-161603** November 1980
Solar Heating, Cooling and Domestic Hot Water System Installed at Columbia Gas System Service Corporation, Columbus Ohio. DOE Contract EG-77-A-01-4089. N81-14394
- CR-161604* September 1980
Shuttle Simulation Turbulence Tapes (SSTT) Users Guide. NAS8-33818. Engineering Analysis, Inc. N81-12134
- CR-161605** December 1980
Solar Domestic Hot Water System Installed at Texas City, Texas. Final Report. Doe Contract EG-77-G-01-1670. N81-90193
- CR-161568 November 1980
Statistical Energy Analysis of Complex Structures, Exhibit C, First Bimonthly Progress Report. NAS8-33191. McDonnell Douglas Corp. N81-70219
- CR-161606 May 28, 1980
Space Shuttle Environment Analysis, Final Report. NAS8-32262. Computer Sciences Corp. N81-90263
- CR-161607 September 1980
Coal Thickness Gauge Using RRAS Techniques, Final Report, Part II and Part III. NAS8-32606. Southwest Research Institute. N81-12524
- CR-161608 August 20, 1980
Orbit Transfer Vehicle (OTV) Engine Phase "A" Study, Extension 1, Final Report, Volume III: Study Cost Estimates. NAS8-32999. Aerojet Liquid Rocket Co. N81-12161
- CR-161609 September 1980
On the Solution of the Unsteady Navier-Stokes Equations for Hypersonic Flow About Axially-Symmetric Blunt Bodies. NAS8-32912. Mississippi State University. N81-12017
- CR-161610 September 1979
Development of CO₂ Laser Doppler Instrumentation for Detection of Clear Air Turbulence, Final Report, Volume II, Appendices. NAS8-28424. Raytheon Co. N81-12698
- CR-161611 September 1979
Development of CO₂ Laser Doppler Instrumentation for Detection of Clear Air Turbulence, Final Report, Volume I. NAS8-28424. Raytheon Co. N81-12697
- CR-161612 September 30, 1980
Scientific Management and Implementation of the Geophysical Fluid Flow Cell for Spacelab Missions, Quarterly Progress Report. NAS8-31958. University of Colorado. N81-12123

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- CR-161613 November 24, 1979
Evaluation of Axial Lock-Up of Space Shuttle Main Engine Bearings from High Pressure Oxygen Turbopump, Final Report -- Task 105, NAS8-33576. Battelle Columbus Laboratories. N80-30895
- CR-161614 October 1980
Evaluation of Space Shuttle Main Engine Fluid Dynamic Frequency Response Characteristics, NAS8-33508. Wyle Laboratories. N81-13087
- CR-161615 October 1980
Conceptual Design Study Science and Applications Space Platform (SASP), Volume I, Executive Summary, NAS8-33592, McDonnell Douglas. N81-13075
- CR-161616 October 1980
Conceptual Design Study Science and Applications Space Platform (SASP), Volume II, Technical Report, NAS8-33592, McDonnell Douglas Astronautics Co. N81-13076
- CR-161617 October 1980
Conceptual Design Studied Science and Applications Space Platform (SASP), Volume III, Programmatics, Cost and Schedule Report, NAS8-33592, McDonnell Douglas Astronautics Co. N81-13077
- CR-161618 November 17, 1980
Space Shuttle Simulation Model, Summary Report, NAS8-33818, Engineering Analysis, Inc. N81-13081
- CR-161619 1980
Analysis of Localized Fringes in the Holographic Optical Schlieren System. Final Report, NAS8-33509, TAI Corp. N81-13329
- CR-161620 July 30, 1980
Rotordynamics Analysis for the HPFTP (High Pressure Fuel Turbopump) of the SSME (Space Shuttle Main Engine) -- Final Report, NAS8-31233, University of Louisville. N81-15017
- CR-161621 December 10, 1980
Orbit Transfer Vehicle (OTV) Advanced Expander Cycle Engine Point Design Study, Final Report, Volume I: Executive Summary, NAS8-33574, Aerojet Liquid Company. N81-15018
- CR-161622 December 12, 1980
Orbit Transfer Vehicle Advanced Expander Cycle Engine Point Design Study, Volume II: Study Results, NAS8-33568, Rockwell International. N81-15019
- CR-161623 October 1, 1980
Orbit Transfer Vehicle (OTV) Advanced Expander Cycle Engine Point Design Study, Task VII Engine Data Summary, NAS8-33574, Aerojet Liquid Rocket Co. N81-15020
- CR-161624 March 1980
Develop and Demonstrate the Performance of Cryogenic Components Representative of Space Vehicles, Phase II Report -- Integrated System Design and Analysis, NAS8-31778, General Dynamics Convair Division. N81-72441
- CR-161625 October 29, 1980
Optical Mass Memory System (AMM-13), AMM-23 System Segment Specification, NAS8-33687, Harris Corp. N81-15708
- CR-161626 October 29, 1980
Optical Mass Memory System (AMM-13) AMM/DBMS Interface Control

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Document, Reissue 2. NAS8-33687.
Harris Corp. N81-15707
- CR-161627 October 1980
Manufacturing Process Applications
Team (MATeam), 3rd Quarterly Report
for 1980. NAS8-32229. IIT Research
Institute.
- CR-161628 September 30, 1980
Materials Processing in Space: Past
Accomplishments and Future Directions
(USRA), Final Report. NAS8-32992.
Universities Space Research Association.
N81-90101
- CR-161629 November 24, 1980
STS-1 Nominal Cycle 3 March/April
Launch, Ascent Base Convective Heat-
ing, Final Report. NAS8-33725. Rem-
tech, Inc. N81-15015
- CR-161630 December 1980
Study of Digital Charge Coupled
Devices, Final Report. NAS8-33194,
Martin Marietta Corp. N81-15193
- CR-161631 December 31, 1980
Etch II — Design, Development, Fabrica-
tion, Test, Integration, and Checkout of
Automatic Chemical Etch Process
Mechanism, Final Report. NAS8-33790.
Consolidated Industries, Inc.
N81-90314
- CR-161632 December 19, 1980
Geophysical Fluid Dynamics Experi-
ment Definition, Interim Report. NAS8-
32360. USRA/Boulder. N81-90315
- CR-161633 January 20, 1981
Warm/Cold Cloud Processes, Final
Report. NAS8-33131. USRA/Boulder.
N81-17668
- CR-161634 January 9, 1981
Solar Array Technology Development
for SEPS (Solar Electric Propulsion),
Final Report. NAS8-31352. Lockheed
Missiles & Space Co. X81-10139
- CR-161635 October 1980
Ultimate Intrinsic—Coercivity Samari-
um—Cobalt Magnet, an Earth-Based
Feasibility Study for Space Shuttle
Missions. NAS8-33607. The Charles
Stark Draper Laboratory. N81-90372
- CR-161636 December 8, 1980
Glass Shell Manufacturing in Space,
Semi-Annual Report. NAS8-33103. KMS
Fusion, Inc. N81-90373
- CR-161637 1980
Stabilized Zeeman Split Laser, Final
Report. NAS8-34036. TAI Corp.
N81-17414
- CR-161638 December 10, 1980
Orbit Transfer Vehicle (OTV) Advanced
Expander Cycle Engine Point Design
Study, Final Report, Volume II: Study
Results. NAS8-33574. Aerojet Liquid
Rocket Co. N81-17141
- CR-161639 January 19, 1981
Orbit Transfer Vehicle Engine Study,
Phase A, Extension 2, Final Report.
NAS8-32999. Aerojet Liquid Rocket Co.
N81-17140
- CR-161640 December 30, 1980
Space Fabrication Demonstration Sys-
tem, Qtrly Prog. Report No. 14, NAS8-
32472. Grumman Aerospace Corp.
N81-90374
- CR-161641 January 21, 1981
Temperature-Controlled Quartz Crystal

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

Microbalance Systems for Monitoring Contamination on Shuttle, Final Report. NAS8-32110. Faraday Lab. N81-90375

Volume II -- Technical. NAS8-33527. General Dynamics Convair Division and Communications Satellite Corp. N81-18073

CR-161642** January 1981
Solar Hot Water System Installed at Las Vegas, Nevada -- Final Report. DOE Contract 77-G-01-1654. La Quinta Motor Inns, Inc. N81-21535

CR-161649 June 1980
Geostationary Platform Systems Concepts Definition Study, Final Report, Volume II -- Technical. NAS8-33527. General Dynamics Convair Division and Communications Satellite Corp. N81-18074

CR-161643 December 1980
Residual Silicone Detection, Final Report for November 13, 1979 through July 12, 1980. NAS8-33694. Rockwell International. N81-18400

CR-161650 June 1980
Geostationary Platform Systems Concepts Definition Study, Final Report, Volume II -- Technical. NAS8-33527. General Dynamics Convair Division and Communications Satellite Corp. N81-18075

CR-161644 January 2, 1981
Simulation of the Magnetic Structure of the Inner Heliosphere by Means of a Non-Spherical Source Surface. NAS8-33376. Harvard-Smithsonian Center for Astrophysics and the Aerospace Corp. N81-18977

CR-161651 June 1980
Geostational Platform Systems Concepts Definition Study, Final Report, Volume IIA -- Appendixes. NAS8-33527. General Dynamics Convair Division and Communications Satellite Corp. N81-18076

CR-161645 January 20, 1981
Preparation of $\text{Si}_x\text{N}_y\text{C}_z$ Fibers by the Controlled Pyrolysis of Novel Organosilicon Polymeric Precursors, Final Report. NAS8-33223. Battelle Columbus Laboratories. X81-10141

CR-161652 June 1980
Geostationary Platform Systems Concepts Definition Study, Final Report, Volume IIA -- Appendixes. NAS8-33527. General Dynamics Convair Division and Communications Satellite Corp. N81-18077

CR-161646 January 1981
Liquid Booster Module (LBM) Plume Flowfield Model. NAS8-33976. Lockheed Missiles & Space Co. N81-18087

CR-161653 December 31, 1980
Coal Gasification Systems Engineering and Analysis, Final Report, Volume I, Executive Summary. NAS8-33824. The BDM Corp. N81-18212

CR-161647 June 1980
Geostationary Platform Systems Concepts Definition Study, Final Report, Volume I -- Executive Summary. NAS8-33527. General Dynamics Convair Division and Communications Satellite Corp. N81-18072

CR-161654 December 31, 1980
Coal Gasification Systems Engineering and Analysis, Final Report, Volume II. NAS8-33824. The BDM Corp. N81-18213

CR-161648 June 1980
Geostationary Platform Systems Concepts Definition Study, Final Report,

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- | | |
|--|--|
| <p>CR-161655 December 31, 1980
Coal Gasification Systems Engineering
and Analysis, Final Report, Appendix
A - Coal Gasification Catalog. NAS8-
33824. The BDM Corp. N81-18214</p> <p>CR-161656 December 31, 1980
Coal Gasification Systems Engineering
and Analysis, Final Report, Appendix
B - Medium BTU Gas Design. NAS8-
33824. The BDM Corp. N81-18215</p> <p>CR-161657 December 31, 1980
Coal Gasification Systems Engineering
and Analysis, Final Report, Appendix
C - Alternate Produce Facility Designs.
NAS8-33824. The BDM Corp. N81-18216</p> <p>CR-161658 December 31, 1980
Coal Gasification Systems Engineering
and Analysis, Final Report, Appendix
D, Cost and Economic Studies. NAS8-
33824. The BDM Corp. N81-18217</p> <p>CR-161659 December 31, 1980
Coal Gasification Systems Engineering
and Analysis, Final Report, Appendix E,
Cost Estimation and Economic Evalua-
tion Methodology. NAS8-33824. The
BDM Corp. N81-18218</p> <p>CR-161660 December 31, 1980
Coal Gasification Systems Engineering
and Analysis, Final Report, Appendix F,
Critical Technology Items/Issues. NAS8-
33824. The BDM Corp. N81-18219</p> <p>CR-161661 December 31, 1980
Coal Gasification Systems Engineering
and Analysis, Final Report, Appendix G
- Commercial Design and Technology
Evaluation. NAS8-33824. The BDM
Corp. N81-18220</p> | <p>CR-161662 December 31, 1980
Coal Gasification Systems Engineering
and Analysis, Final Report, Appendix
H - Work Breakdown Structures. NAS8-
33824. The BDM Corp. N81-18221</p> <p>CR-161663* February 25, 1981
A Statistical Data Analysis and Plotting
Program for Cloud Microphysics Experi-
ments. P.O. H-43036B. ESPEE, Inc.
 N81-20665</p> <p>CR-161664* March 1, 1979
Summary of Jimsphere Wind Profiles -
Programs, Data, Comments, Part 1 of
Final Report. NAS8-32432. Computer
Sciences Corp. N81-20667</p> <p>CR-161665* February 1980
Laser-Heated Thruster. Interim Report.
NAS8-33097. Physical Sciences, Inc.
 N81-21123</p> <p>CR-161666* September 1980
Laser-Heated Thruster. Final Report.
NAS8-33097. Physical Sciences, Inc.
 N81-21124</p> <p>CR-161667 October 1980
Hardware Synthesis from DDL Descrip-
tion. NAS8-33096. University of Ala-
bama in Huntsville. N81-19778</p> <p>CR-161668 February 28, 1981
Orbit Transfer Vehicle Engine Study,
Phase A - Continuation. NAS8-32996.
Rockwell International. N81-19216</p> <p>CR-161669 January 20, 1981
Geophysical Fluid Dynamics Experi-
ment Definition. NAS8-32360. USRA/
Boulder.</p> <p>CR-161670 January 1981
The Growth of Metastable Peritectic</p> |
|--|--|

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Compounds, Annual Report. NAS8-32998. Clarkson College of Technology. N81-19275
- CR-161671 July 1980
SPAR VI Technical Report for Experiment 76-22 - Directional Solidification of Magnetic Composites. NAS8-32219, Grumman Aerospace Corp. N81-19231
- CR-161672 March 12, 1981
Transfer Film Evaluation for Shuttle Engine Turbopump Bearing. NAS8-33576. Battelle Columbus Labs. N81-20425
- CR-161673 January 1980
Dynamics of Cavitating Cascades, Final Report. NAS8-29313. California Institute of Technology. N81-20382
- CR-161674 March 1, 1980
SPAR VI Experiment Report, Containerless Processing of Glass, Experiment 74-42. NAS8-32023. Rockwell International. N81-20102
- CR-161675** September 1980
Solar Space and Water Heating System Installed at Charlottesville, Virginia. DOE Contract EG-77-A-01-4095. David C. Wilson Neuropsychiatric Hospital. N81-22471
- CR-161676 December 29, 1978
Wind Profiles for Space Shuttle Loads Analysis, Final Report. NAS8-32839. Science Applications, Inc. N81-20666
- CR-161677 February 27, 1981
Dual Nozzle Aerodynamic and Cooling Analysis Study, Final Report. NAS8-33553. Aerojet Liquid Rocket Co. N81-20175
- CR-161678 July 1980
Ultracure Metals Preparation in Space, Final Report. NAS8-33115. UCLA Eng. N81-20101
- CR-161679** March 1981
Solar Heating and Cooling System Installed at RKL Controls Company, Lunberton, New Jersey - Final Report. DOE Contract EX-76-C-01-2397. RKL Controls Co. N81-23597
- CR-161680 February 1981
X-Ray Diffraction Analysis of Nb₃Ge. NAS8-33548. University of Alabama in Huntsville. N81-90452
- CR-161681 October 1979
NASA File Update Subsystem User Manual for the NASA Relational Data Base. NAS8-32526. Science Applications, Inc. N81-74187
- CR-161682 February 1979
NASA Relational Data Base Management System (RDBMS) User Manual, Final Report. NAS8-32526. Science Applications, Inc. N81-74188
- CR-161683 August 10, 1979
NSSC-II Software System Users Guide, Final Report. NAS8-32526. Science Applications, Inc. N81-74123
- CR-161684 February 23, 1981
LBM Plume Radiation. NAS8-34002. Remtech, Inc. N81-90134
- CR-161685 October 15, 1980
Structural Attachments for Large Space Structures. NAS8-33599. Essex Corp. N81-21101
- CR-161686 April 15, 1980
Assessment of Current and Projected

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Performance Characteristics of Deployable Structural Masts. NAS8-33712. Astro Research Corp. X81-10121
- CR-161687 March 1980
Space Base Radiation Analysis Study, Final Report. NAS8-32387. Science Applications, Inc. N81-23006
- CR-161688 March 1978
Trans-Uranic Cosmic Rays (Skylab Exp. S-228), Final Report. NAS8-29603. University of California. N81-74324
- CR-161689 April 1981
Vector Wind Profile Gust Model, Final Report. NAS8-33433. Computer Sciences Corp. N81-22659
- CR-161690 March 30, 1981
Space Fabrication Demonstration System, Quarterly Progress Report No. 15. NAS8-32472. Grumman. N81-74345
- CR-161691 March 1981
Final Study Report of an Applications Study of Advanced Power Generation Systems Utilizing Coal-Derived Fuels. NAS8-33996. United Technologies Research Center. N81-21538
- CR-161692 March 1981
Final Study Report of an Applications Study of Advanced Power Generation Systems Utilizing Coal-Derived Fuels. NAS8-33996. United Technologies Research Center. N81-21539
- CR-161693 November 1977
Space Fabrication Demonstration System Quarterly Progress Report No. 3. NAS8-32742. Grumman Aerospace Corp. N81-21090
- CR-161694 February 1978
Space Fabrication Demonstration System Quarterly Progress Report No. 4. NAS8-32472. Grumman Aerospace Corp. N81-21091
- CR-161695 May 1978
Space Fabrication Demonstration System Quarterly Progress Report No. 5. NAS8-32472. Grumman Aerospace Corp. N81-21092
- CR-161696 October 1979
Manufacturing Process Application Team (MATeam), 3rd Quarterly Report for 1979. NAS8-32229. IIT Research Institute. N81-22251
- CR-161697 February 27, 1981
Erectable Concepts for Large Space System Technology, Vol. I, Executive Summary. NAS8-33431. Vought Corp.
- CR-161698 February 27, 1981
Erectable Concepts for Large Space System Technology, Vol. II, Technical Report. NAS8-33431. Vought Corp.
- CR-161699 March 1981
Orbit Transfer Vehicle Engine Study, Phase A. NAS8-32999. Aerojet Liquid Rocket Co. N81-21126
- CR-161700 January 1981
Automated Directional Solidification System for Space Processing. NAS8-31536. General Electric. N81-19157
- CR-161701 March 15, 1981
Test Charge Injection Device, Phase I - Technical Report, October 15, 1980. NAS8-33952. N81-21102
- CR-161702 October 31, 1978
Space Processing of Chalogenide Glasses, Final Report. NAS8-32388. IIT Research Institute. N81-21192
- CR-161703 March 24, 1981
Development, Qualification and Delivery

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- of a Hydrogen Burnoff Igniter, Final Report. NAS8-34195. Unidynamics Phoenix, Inc. N81-21144
- CR-161704 January 3, 1980
Space Fabrication Demonstration System, Quarterly Progress Report No. 10. NAS8-32472. Grumman Aerospace Corp. N81-21095
- CR-161705 December 1978
Space Fabrication Demonstration System, Quarterly Progress Report. No. 6. NAS8-32472. Grumman Aerospace Corp. N81-21093
- CR-161706 August 30, 1977
Space Fabrication Demonstration System, Quarterly Progress Report No. 2, May 17, 1977-August 26, 1977. NAS8-32472. Grumman Aerospace Corp. N81-21094
- CR-161707 October 15, 1978
Orbit Transfer Vehicle (OTV) Engine Phase "A" Study, Bi-Monthly Status Report No. 2. NAS8-32999. Aerojet Liquid Rocket Co. N81-74224
- CR-161708 July 31, 1979
Orbit Transfer Vehicle Engine Study, Phase A, Ext. 1, Study Plan Update. NAS8-32999. Aerojet Liquid Rocket Co. N81-22079
- CR-161709 April 30, 1980
Orbit Transfer Vehicle Engine Study, Phase A, Ext. 1, (Alternate Low Thrust Capability, Task Report). NAS8-32999. Aerojet Liquid Rocket Co. N81-22080
- CR-161710 November 30, 1979
Orbit Transfer Vehicle Engine Study, Phase A, Ext. (Advanced Expander Cycle Engine Optimization, Task Report). NAS8-32999. Aerojet Liquid Rocket Co. N81-22081
- CR-161711 December 1979
Mathematical Models of Continuous Flow Electrophoresis (Progress Report for 1 May 79 - 31 Dec 79). NAS8-32614. Princeton University. N81-74352
- CR-161712* May 1980
Characterization of Silicon-Gate CMOS/SOS Integrated Circuits Processed with Ion Implantation, Final Report. NAS8-31986. RCA Corp. N81-76503
- CR-161713 December 1978
Scientific Management and Implementation of the Geophysical Fluid Flow Cell for Spacelab Mission, Quarterly Progress Report. NAS8-31958. University of Colorado.
- CR-161714 September 1978
Scientific Management and Implementation of the Geophysical Fluid Flow Cell for Spacelab Missions, Quarterly Report. NAS8-31958. University of Colorado.
- CR-161715 December 1979
The Growth of Metastable Peritectic Compounds, Quarterly Progress Report No. 3. NAS8-32998. Grumman Aerospace Corp.
- CR-161716 April 1980
Space Fabrication Demonstration, Quarterly Progress Report No. 11. NAS8-32472. Grumman Aerospace Corp.
- CR-161717 December 1979
Scientific Management and Implementation of the Geophysical Fluid Flow Cell for Spacelab Missions, Quarterly Progress Report. NAS8-31958. University of Colorado.
- CR-161718 September 1979
Scientific Management and Implementation of the Geophysical Fluid Flow Cell

NASA CONTRACTOR REPORTS

(Abstracts for these reports may be obtained from STAR)

for Spacelab Mission One, Quarterly Progress Report, NAS8-31958, University of Colorado,

Colorado, NAS8-32036, IBM Corp.
N81-23607

March 1979 **NAS8-31958**
**Scientific Management and Implementa-
 tion of the Geophysical Fluid Flow Cell
 For Spacelab Mission One, Quarterly
 Progress Report. NAS8-31958. Univer-
 sity of Colorado.**

CR-161726 September 30, 1980**
Solar Energy System Economic Evaluation
- Final Report for IBM System 4,
Clinton, Mississippi. NAS-32036, IBM
Corp. N81-24531

CR-161720 **March 1981**
Analysis and Calculation of Macro-
segregation in a Casting MPS Solidifica-
tion Model, Volume II: Operating
Guide and Software Documentation for
the Unsteady Model. NAS8-33573,
General Electric. N81-22159

CR-161727** **September 1980**
Solar Energy System Economic Evaluation
- Final Report for Contemporary
Newnan, Newnan, Georgia. NAS8-
32036. IBM Corp. N81-24585

CR-161721 April 30, 1981
Dispersion Model Studies for Space
Shuttle Environmental Effects Activities.
NAS8-31841, University of Utah,
N81-22588

CR-161728** **September 1980**
Solar Energy System Economic Evaluation
-- Final Report for IBM System 3,
Glendo, Wyoming. NA58-32036, IBM
Corp. N81-24541

CR-161722** **September 1980**
Solar Energy System Economic Evaluation
- Final Report for Wormser,
Columbia, South Carolina. NAS8-32036.
IBM Corp. N81-23605

CR-161729** **September 1980**
Solar Energy System Economic Evaluation
-- Final Report for Solaron Akron,
Akron, Ohio. NAS8-32036, IBM Corp.
N81-25541

CR-161723** September 1980
Solar Energy System Economic Evaluation - Final Report for Fern Tunkhannock, Tunkhannock, Pennsylvania.
NAS8-32036, IBM Corp. **N81-24532**

CR-161730** **September 1980**
Solar Energy System Economic Evaluation -- Final Report for IBM System 1B,
Carlsbad, New Mexico. NAS8-32036.
IBM Corp. N81-25542

CR-161724** September 1980
Solar Energy System Economic Evaluation - Final Report for Seeco Lincoln, Lincoln, Nebraska. NAS8-32036. IBM Corp. N81-25510

CR-161731** May 1981
Solar Heating and Hot Water System
Installed at Charlotte Memorial Hospital,
Charlotte, NC. DOE Contract EX-76-C-
01-2394. Ferebee, Walters and Asso-
ciates. N81-23606.

CR-161725** September 1980
Solar Energy System Economic Evaluation
- Final Report for Colt Pueblo,

CR-161732 **June 1976**
**Evaluation of Advanced Microelectronic
 Fluxless Solder-Bump Contacts for Hy-
 brid Microcircuits, NAS8-31496,
 Applied Technology, N81-22283**

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- CR-161733 January 1979
Payload Mission Integration Progress
Report, NAS8-32712, Teledyne Brown
Engineering. X81-10233
- CR-161734 March 1979
Payload Missions Integration, Data
Requirement MA-03 Progress Report,
NAS8-32712, Teledyne Brown Engineer-
ing. X81-10234
- CR-161735 May 1979
Payload Missions Integration Progress
Report, Data Requirement MA-03,
NAS8-32712, Teledyne Brown Engi-
neering. X81-10235
- CR-161736 July 1979
Payload Mission Integration, Data
Requirement MA-03-Progress Report,
NAS8-32712, Teledyne Brown Engi-
neering. X81-10236
- CR-161737 November 1979
Payload Mission Integration Progress
Report, NAS8-32712, Teledyne Brown
Engineering.
- CR-161738 March 1980
Payload Mission Integration Progress
Report, NAS8-32712, Teledyne Brown
Engineering. X81-10237
- CR-161739 September 1980
Payload Mission Integration Progress
Report, NAS8-32712, Teledyne Brown
Engineering. X81-10238
- CR-161740 January 1981
Payload Missions Integration Progress
Report, Data Requirements MA-03,
NAS8-32712, Teledyne Brown Engi-
neering. X81-10239
- CR-161741 March 1981
Payload Missions Integration Progress
Report, NAS8-32712, Teledyne Brown
Engineering. X81-10420
- CR-161742 July 1974
Physical Forces Influencing Skylab
Experiment M-566 -- Summary Report,
NAS8-27015, Lockheed Missiles and
Space Co. N81-74551
- CR-161743 July 1974
Solidification Theory for Skylab Experi-
ment M-566 -- Summary Report, NAS8-
37015, Lockheed Missiles and Space Co.
N81-74552
- CR-161744 July 1974
Convection Effects on Skylab Experi-
ment M-511, NAS8-27015, Lockheed
Missiles and Space Co. N81-74549
- CR-161745 July 1974
Convection Effects on Skylab Experi-
ment M-566, Phase B and C (Topical)
Report, NAS8-27015, Lockheed Missiles
and Space Co. N81-74550
- CR-161746 November 1980
Defect Chemistry and Characterization
of $Hg_{1-x}Cd_xTe$, NAS8-33245, Honey-
well Electro-Optics Center. N81-23924
- CR-161747 April 15, 1981
Evaluation and Prediction of Long-Term
Space Environmental Effects on Non-
Metallic Materials (Quarterly Progress
Report No. 6), Martin Marietta Corp.
N81-74560
- CR-161748 April 1981
Advanced Oxygen-Hydrocarbon Rocket
Engine Study, NAS8-33452, Aerojet
Liquid Rocket Co. N81-23186
- CR-161749 March 31, 1981
Scientific Management and Implementa-
tion of the Geophysical Fluid Flow Cell

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- for Spacelab Missions. NAS8-31958.
University of Colorado. N81-75938
- CR-161750 April 28, 1981
Satellite Power Systems (SPS) Concept
Definition Study (Exhibit F), Final
Performance Review. NAS8-32475.
Rockwell International. N81-23599
- CR-161751 February 16, 1981
Study of Thermal Control Systems for
Orbiting Power Systems, Final Report.
NAS8-33560. Vought Corp. N81-22076
- CR-161752 February 1980
Materials Processing Threshold Report.
I. Semiconductor Crystals for Infrared
Detectors, Final Report. NAS8-33554.
System Planning Corp. N81-23100
- CR-161753 April 1981
Science and Applications Space Plat-
form (SASP) End-to-End Data System
Study. NAS8-33592. McDonnell Doug-
las Astronautics Co. N81-22069
- CR-161754 April 22, 1981
Research Study: STS-1 Orbiter Descent.
NAS8-34334. Atsuko Computing Inter-
national. N81-23763
- CR-161755 May 1981
Defect Chemistry and Characterization
of $(\text{Hg}_{1-x}\text{Cd}_x)\text{Te}$. NAS8-33245. Honey-
well, Inc. N81-23925
- CR-161756** May 1981
Solar Heating and Hot Water System
Installed at Alderson Broaddus College,
Philippi, West Virginia. DOE Contract
EM-78-FO1-5228. J. E. Sturm, Inc.
N81-75089
- CR-161757 November 1976
Shuttle Comet Research: Proceedings of
the Shuttle-Based Cometary Science
Workshop, A Forum for the Presenta-
tion and Discussion of Possible Shuttle-
Based Experiments and Observations of
Comets and Cometary-Like Materials.
NAS8-32225. University of Alabama.
- CR-161758 August 1980
Advanced Oxygen-Hydrocarbon Rocket
Engine Study, (Bi-Monthly Progress
Report No. 5). NAS8-33452. Aerojet
Liquid Rocket Co. N81-29156
- CR-161759 June 1980
Advanced Oxygen-Hydrocarbon Rocket
Engine Study, (Bi-Monthly Progress
Report No. 4). NAS8-33452. Aerojet
Liquid Rocket Co. N81-23185
- CR-161760 April 1980
Advanced Oxygen-Hydrocarbon Rocket
Engine Study (Bi-Monthly Progress Re-
port No. 3). NAS8-33452. Aerojet
Liquid Rocket Co. N81-23184
- CR-161761 November 1980
Study of Thermal Control Systems for
Orbiting Power Systems Materials Ex-
periment Carrier Thermal Control Sys-
tem Study. NAS8-33560. Vought Corp.
N81-24148
- CR-161762* April 1981
Summary Report of Studies Conducted
as a Search for Physical Mechanisms
Relating Solar Variability and the
Troposphere. NAS8-33443. The Univer-
sity of Alabama in Huntsville.
N81-25605
- CR-161763** May 1981
Solar Space Heating Installed at Kansas
City, Kansas (Final Report). DOE Con-
tract EG-77-A-01-4079. Ducat Invest-
ments, Inc. N81-26557

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- CR-161764 May 1981
Solutal Effects in Convecto-Diffusive
Dendritic Growth. NAS8-32690. Rens-
selaer Polytechnic Institute. N81-74915
- CR-161765* December 1980
Accelerated Life Testing Effects on
CMOS Microcircuit Characteristics, Final
Report. NAS8-31905. RCA.
- CR-161766 July 1978
Payload Mission Integration Progress
Report. NAS8-32712. Teledyne Brown
Engr. X81-10222
- CR-161767 June 1978
Payload Mission Integration Progress
Report. NAS8-32712. Teledyne Brown
Engineering. X81-10223
- CR-161768 May 6, 1981
Noise and Interference Study for Satel-
lite Lightning Sensor. NAS8-33891.
Radio Sciences Co. N81-25281
- CR-161769 February 1981
Theoretical Investigation of the Genera-
tion and Injection of Elect Magnetic
Waves in Space Plasma by Means of a
Long-Orbiting Tether. NAS8-33520.
Smithsonian Institution Astrophysical
Observatory. N81-24322
- CR-161770 October 15, 1981
Coal Liquefaction Processes and Devel-
opment Requirements Analysis for Syn-
thetic Fuels Production. NAS8-34046.
Spectra Research Systems. N81-25238
- CR-161771 July 10, 1980
Advanced Technology Applications for
Second and Third Generation Coal
Gasification Systems. NAS8-33846.
Spectra Research Systems. N81-25230
- CR-161772 July 10, 1980
Advanced Technology Applications for
Second and Third Generation Coal
Gasification Systems (Appendix). NAS8-
33846. Spectra Research Systems.
N81-25231
- CR-161773 July 1980
Coal Conversion Products Industrial
Applications. NAS8-33843. Technology
Development Corp. N81-25237
- CR-161774 December 1975
High Rate Multiplexer Design Concept
Study Report. NAS8-31484. Martin-
Marietta.
- CR-161775 May 1980
An Analytical Procedure and Automated
Computer Code Used to Design Model
Nozzles Which Meet MSFC Base Pressure
Similarity Parameter Criteria. NAS8-
33801. Lockheed.
- CR-161776* March 1, 1981
Summary of Jimsonde Temperature
Profiles — Programs, Data, Comments.
NAS8-32432. Computer Sciences Corp.
N81-25626
- CR-161777 July 1977
The Thermal Conductivity and Specific
Heat of an Ablative Material Designated
as MXSA. NAS8-32477. Dynatech Re-
search and Development Co. N81-74905
- CR-161778 August 1979
Combination Control Study in Hybrid
Microcircuit Modules. NAS8-32437.
Vanderbilt University. N81-25304
- CR-161779 June 1, 1981
Coal Conversion Systems Design and
Process Modeling, Volume I: Applica-
tion of MPPM and Aspen Computer

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Models. NAS8-34264. Spectra Research Systems. N81-25233
- CR-161780 June 1, 1981
Coal Conversion Systems Design and Process Modeling -- Volume II: Installation of MPPM on the Sigma 9 Computer. NAS8-34264. Spectra Research Systems. N81-25234
- CR-161781 June 1972
Shuttle Free Flying Teleoperator System Experiment Definition, Volume II, Technical Report. NAS8-27895. Bell Aerospace Co.
- CR-161782 November 1978
Users Manual-Standard Load Center Converter. NAS8-32515. Martin Marietta Corp. N81-74977
- CR-161783 1980
Orbital Transfer Vehicle -- Concept Definition Study, Volume 1: Executive Summary, Final Report. NAS8-33532. The Boeing Company. X81-75664
- CR-161784 1980
Orbital Transfer Vehicle -- Concept Definition Study, Volume 2: Mission Analysis and Operations, Final Report. NAS8-33532. The Boeing Co. X81-75665
- CR-161785 1980
Orbital Transfer Vehicle -- Concept Definition Study, Volume 3: Conceptual Analysis and Developmental Approaches. NAS8-33532. The Boeing Co. X81-75666
- CR-161786 1980
Orbital Transfer Vehicle -- Concept Definition Study, Volume 4: Selected Concept Definition, Final Report. NAS8-33532. The Boeing Co. X81-75667
- CR-161787 1980
Orbital Transfer Vehicle -- Concept Definition Study, Volume 5, Program Definition, Final Report. NAS8-33532. The Boeing Co. X81-75668
- CR-161788 1980
Orbital Transfer Vehicle -- Concept Definition Study, Volume 6: Program Study Cost Estimates, Final Report. NAS8-33532. The Boeing Co. X81-75669
- CR-161789 February 23, 1981
Orbital Transfer Vehicle -- Concept Definition Study, Volume 1: Executive Summary, Final Report. NAS8-33533. General Dynamics Convair Division. X81-75659
- CR-161790 March 1981
Orbital Transfer Vehicle -- Concept Definition Study, Volume 2: Mission Analysis and Operations, Final Report. NAS8-33533. General Dynamics Convair Division. X81-75660
- CR-161791 March 1981
Orbital Transfer Vehicle -- Concept Definition Study, Volume 3, Data Book, Final Report. NAS8-33533. General Dynamics Convair Division. X81-75661
- CR-161792 February 23, 1981
Orbital Transfer Vehicle -- Concept Definition Study, Volume 4: Selected Concept Definition and Volume 5: Program Definition, Final Report. NAS8-33533. General Dynamics Convair Division. X81-75662
- CR-161793 March 1981
Orbital Transfer Vehicle -- Concept Definition Study, Volume 6, Cost Estimates, Final Report. NAS8-33533. General Dynamics Convair Division. X81-75663

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- CR-161794* April 1981
Lightning Detection from Space —
Science and Applications Team Review.
NAS8-33715. Rice University.
N81-25625
- CR-161795 December 18, 1980
Spectrophotovoltaic Orbital Power Gen-
eration. NAS8-33511. Honeywell Sys-
tems and Research Center. N81-25508
- CR-161796 February 1980
Materials Processing Threshold Report.
II: Use of Low Gravity for Cast Iron
Process Development. NAS8-33518. Sys-
tem Planning Corp. N81-25093
- CR-161797** May 1981
Solar Heating and Hot Water System
Installed at Arlington Racquet Ball
Club, Arlington, Virginia, Final Report.
DOE Contract EM-78-F-01-5211. ARC
Associates. N81-28518
- CR-161798 July 1978
Hydrodynamic Support (HDS) for Space
Shuttle MGVVT. NAS8-32424. Martin-
Marietta Aerospace. N81-75193
- CR-161799 June 3, 1981
Research Study for "Glass Shell Manu-
facturing in Space", Semi-Annual Report
from December 1980 - June 1981.
NAS8-33103. KMS Fusion, Inc.
- CR-161800 March 3, 1981
Synfuel Economic Evaluation Model
(SEEM) Program Description/User
Manual. NAS8-34265. Sparta, Inc.
N81-76244
- CR-161801 September 20, 1977
Holographic Study of Bonds and De-
bonds. NAS8-32468. Engineering Con-
sultants, Inc. N81-76284
- CR-161802** May 1981
Solar Domestic Hot Water System Man-
ual for Day's Inn, Garland, Texas. DOE
Contract EG-77-01-1632. Day's Inn of
America, Inc. N81-28515
- CR-161803** June 1981
Solar Heating System Installed at Belz
Investment Company, Memphis, Ten-
nessee, Final Report. DOE Contract
EM-78-F-01-5210. N81-28521
- CR-161804 July 1977
The SRB Thermal Environment Data
Book. NAS8-32522. Remtech, Inc.
N81-75866
- CR-161805 June 1978
MSA Packaging. NAS8-32210. Acurex
Corp.-Aerospace Systems Division.
N81-75612
- CR-161806 January 29, 1981
Report of Phase I Portion of Hazard
Evaluation Tests for Lithium/Carbon
Monofluoride Cells and Batteries. NAS8-
33933. Eagle-Picher Industries, Inc.
- CR-161807 October 30, 1979
Geostationary Platforms Mission and
Payload Requirements Study, Volume I:
Executive Summary. NAS8-33226.
COMSAT Laboratories. N81-26164
- CR-161808 October 30, 1980
Geostationary Platforms Mission and
Payload Requirements Study, Volume
II: Technical. NAS8-33226. COMSAT
Laboratories. N81-26165
- CR-161809 December 1980
Addition to the Lewis Chemical Equi-
librium Program to Allow Computa-
tion from Coal Composition Data.
NAS8-31640. Computer Sciences Corp.
N81-26276

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- CR-161810 May 1981
Stream Table Program User's Manual
and Program Document. NAS8-31640.
Computer Sciences Corp. N81-26746
- CR-161811 May 1981
The Lewis Chemical Equilibrium Pro-
gram with Parametric Study Capability.
NAS8-31640. Computer Sciences Corp.
N81-26275
- CR-161812 June 1981
Timeline Resource Analysis Program
(TRAP) User's Manual and Program
Document. NAS8-31640. Computer
Sciences Corp. N81-26747
- CR-161813 April 1, 1981
Spectrophotovoltaic Orbital Power Gen-
eration (Phase II). NAS8-33511. Honey-
well, Inc. N81-27620
- CR-161814 April 1981
High-Pressure Lox/Hydrocarbon Pre-
burners and Gas Generators. NAS8-
33243. Rockwell International.
N81-27619
- CR-161815 April 1981
X-Ray Topography Study of Complex
Silicon Microcircuits. NAS8-33519.
Texas A and M University. N81-27406
- CR-161816 May 30, 1980
Investigation of Multiple Scattering
Effects in Aerosols. NAS8-33135. Insti-
tute for Atmospheric Optics and Remote
Sensing. N81-27725
- CR-161817 1981
Space Fabrication Demonstration,
Quarterly Report No. 16. NAS8-32472.
Grumman Aerospace. N81-75519
- CR-161818 June 1981
Theoretical Modeling and Data Analysis
for Skylab ATM Experiments (S-056)
and Others. NAS8-28097. University of
Alabama in Huntsville. N81-76199
- CR-161819 June 5, 1981
Pinhole-Coronagraph Tracking Control.
P.O. No. H-52750B. JMA, Inc.
N81-27461
- CR-161820 July 1981
Logic Synthesis from DDL Description.
NAS8-33096. University of Alabama in
Huntsville.
- CR-161821 July 1981
Statistical Energy Analysis of Complex
Structures, Fifth Bimonthly Progress
Report. NAS8-33191. McDonnell Doug-
las Astronautics Co.
- CR-161822 July 7, 1981
Co-Investigator Tasks on SEPAC Experi-
ments for the First Spacelab Mission.
NAS8-32580. TRW.
- CR-161823 May 1981
Ultimate Intrinsic-Coercivity Samarium-
Cobalt Magnet, an Earth-Based Feasi-
bility Study for Space Shuttle Missions.
NAS8-33607. The Charles Stark Draper
Laboratory, Inc. N81-75855
- CR-161824 May 25, 1981
Theoretical Model for a Single Particle
Echo Signature Using Light Scattering
Theory. Southern University.
N81-76171
- CR-161825** June 1981
Design Data Package and Operating
Procedures for MSFC Solar Simulator
Test Facility. DOE Contract DEN-
000006. Wyle Laboratories.
- CR-161826 February 1981
Investigation of Electrodynamic Stabili-
zation and Control of Long Orbiting

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- Tethers. NAS8-33691. Smithsonian Institution Astrophysical Observatory. N81-28128**
- CR-161827 April 30, 1981**
Charge Injection Device Evaluation Hardware. NAS8-33740. Bendix Corp. N81-28355
- CR-161828 May 1981**
Minimum Hamiltonian Ascent Shuttle Trajectory Evaluation Program (MASURE) (LBM Modification). NAS8-33803. Dynetics, Inc. N81-75864
- CR-161829 October 19, 1978**
Summary of Skylab Mission Patches. NAS8-32974. IBM Corp.
- CR-161830** July 1981**
Solar Heating and Hot Water System Installed at James Hurst Elementary School, Portsmouth, Virginia. DOE Contract ME-78-F01-5205.
- CR-161831 March 15, 1981**
Orbit Transfer Vehicle (OTV) Advanced Expander Cycle Engine Point Design Study, Volume 1: Executive Summary. NAS8-33567. Pratt and Whitney Aircraft. N81-30178
- CR-161832 March 15, 1981**
Orbit Transfer Vehicle (OTV) - Advanced Expander Cycle Engine Point Design Study, Volume II: Final Technical Report. NAS8-33567. Pratt and Whitney Aircraft. N81-30179
- CR-161833 March 15, 1981**
Orbit Transfer Vehicle (OTV) Advanced Expander Cycle Engine Point Design Study - Volume III: Engine Data Summary. NAS8-33567. Pratt and Whitney Aircraft. N81-30180
- CR-161834 October 31, 1980**
Space Processing of Chalcogenide Glass, IITRI. NAS8-32388. IITRI. N81-30145
- CR-161835 June 1981**
Design, Fabrication and Test of Last Cut Follower. NAS8-33700. Science Applications, Inc. N81-30964
- CR-161836 May 1978**
UAH/NASA Workshop on the Uses of a Tethered Satellite System. NAS8-30563. University of Alabama in Huntsville. N81-29479
- CR-161837 May 15, 1981**
SEPAC Software Configuration Control Plan and Procedures, Rev. 1, NAS8-33806. Intermetrics, Inc. N81-76470
- CR-161838 May 8, 1978**
Instrument Development Plan for Dynamics Explorer Retarding Ion Mass Spectrometer, Part I, Technical Plan. NAS8-32831. University of Texas at Dallas. N81-76283
- CR-161839 May 8, 1978**
Instrument Development Plan for Dynamics Explorer Retarding Ion Mass Spectrometer, Part I, Technical Plan, Appendices A, B, C, D. NAS8-32831. University of Texas at Dallas. N81-76282
- CR-161840 1980**
Manufacturing Process Applications Team (MATeam), Annual Report. NAS8-32229. IITRI.
- CR-161841 February 1981**
Parametric Study of Thermal Storage Containing Rocks or Fluid Filled Cans for Solar Heating and Cooling. NSG-8041. Alabama Agricultural and Mechanical University.

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

- CR-161842 July 1981
Mechanical Properties of Turbine Blade Alloys in Hydrogen at Elevated Temperatures. NAS8-33561. Pratt and Whitney Aircraft.
- CR-161843 June 1981
High Resolution Angular Sensor. NAS8-31840. Raytheon Co.
- CR-161844 July 1981
Study of the Dissociation of Molecular Hydrogen. NAS8-33521. The Smithsonian Institution Astrophysical Observatory.
- CR-161845** September 1981
Indoor Test for the Thermal Performance Evaluation of the DEC 8A Large Manifold Sunmaster Evacuated Tube (Liquid) Solar Collector. DEN-000006. Wyle Laboratories.
- CR-161846 January 1981
Design of a Laser System for Instantaneous Location of a Longwall Shearer. NAS8-34185. Adjunct Systems.
- CR-161847 April 7, 1981
In-Mine Testing of a Natural Background Sensor, Part B. NAS8-33064. General Electric Co.
- CR-161848 1981
Fabrication and Testing of Aprototype Longwall Face Alignment System, Final Technical Report. Adjunct Systems, Inc.
- CR-161849 June 15, 1981
Coal Face Measurement System for Underground Use. NAS8-33792. The Benton Corp.
- CR-161850 March 1981
Thrust Augmented Shuttle Wind Tunnel Test 1A603 Data Analysis and Results. NAS8-33134. Northrop Services, Inc.
- CR-161851 August 1981
Molecular Model for Ice Nucleation and Growth. NAS8-31150. University of Missouri-Rolla.
- CR-161852** September 1981
An Analytical Comparison of the Efficiency of Solar Thermal Collector Arrays With and Without External Manifolds. DEN8-000006. Wyle.
- CR-161853 August 1981
Technology and Development Requirements for Advanced Coal Conversion Systems. NAS8-34264. Spectra Research Systems.
- CR-161854 July 1981
Shuttle Derived Vehicles (SDV) — Technology Requirements Study. NAS8-34183. Martin Marietta Aerospace.
- CR-161855 1981
Research Reports — 1981 NASA/ASEE Summer Faculty Fellowship Program. University of Alabama.
- CR-161856** September 1981
Performance Evaluation of the Solar Kinetics T-700 Line Concentrating Solar Collector. DEN8-000006. Wyle Laboratories.
- CR-161857 September 18, 1981
IGDS/Trap Interface Program (ITIP) — Software User Manual (SUM). NAS8-34279. Intergraph Corp.
- CR-161858 September 18, 1981
IGDS/Trap Interface Program (ITIP) — Software Design Document. NAS8-34279. Intergraph Corp.

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR-161859 September 8, 1981
IGDS/Trap Interface Program (ITIP) –
Detailed Design Specification (DDS).
NAS8-34279. Intergraph Corp.

CR-161860 October 1965
Technical Summary Report of Research
on the Dynamic Stability of a Large
Flexible Booster Subjected to Longi-
tudinal End Thrusts. NAS8-11255.
Northrop Space Laboratories.

CR-161861 1981
Design Requirements for the SRB
Production Control System, Volume I:
Study Background and Overview. NAS8-
34207. A. T. Kearney, Inc.

CR-161862 1981
Design Requirements for the SRB
Production Control System, Volume II:
System Requirements and Conceptual
Description. NAS8-34207. A. T.
Kearney, Inc.

CR-161863 1981
Design Requirements for SRB Produc-
tion Control System, Volume III; Pack-
age Evaluation, Modification and Hard-
ware. NAS8-34207. A. T. Kearney, Inc.

CR-161864 1981
Design Requirements for SRB Produc-
tion Control System, Volume IV; Imple-
mentation. NAS8-34207. A. T. Kearney,
Inc.

CR-161865 1981
Design Requirements for SRB Produc-
tion Control System, Volume V: Appen-
dices. NAS8-34207. A. T. Kearney, Inc.

CR-161866** September 1981
Evaluation of "All-Day Efficiency" for
Selected Flat-Plate and Evacuated Tube
Collectors. DEN8-000006. Wyle Labs.

*White cover reports published at MSFC.
**DOE/NASA reports.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

ANDERSON, B. J. ES81
HALLETT, J.
BEESLEY, E. M.

An Extended Classical Solution of the Droplet Growth Problem. For publication in the Journal of Aerosol Science.

ANTAR, BASIL N. ES82
FOWLIS, WILLIAM W. ES82

Baroclinic Instability of a Real Rotating Hadley Cell. For publication in the Journal of the Atmospheric Sciences.

BAUGHER, C. R. ES53
CHAPPELL, C. R. ES53
HORWITZ, J. L.

University of Alabama in Huntsville
SHELLEY, E. G.

Lockheed Palo Alto Research Lab.

YOUNG, D. T. University of Bern
Conical Pitch Angle Distributions of Very Low-Energy Ion Fluxes Observed by ISEE-1. For publication in the Journal of Geophysical Research.

BAUGHER, C. R. ES53
CHAPPELL, C. R. ES53
HORWITZ, J. L.

University of Alabama in Huntsville
SHELLEY, E. G.

Lockheed Palo Alto Research Lab.

YOUNG, D. T. University of Bern
ANDERSON, R. R. University of Iowa
ISEE-1 Observations of Thermal Plasma in the Vicinity of the Plasmasphere During Periods of Quieting Magnetic Activity. For publication in the Journal of Geophysical Research.

BECHTEL, ROBERT T. EC31
The 30 cm J Series Ion Thruster. For presentation at the 15th International Electric Propulsion Conference to be held in Las Vegas, NV on April 21-23, 1981.

BLACKWELL, DOUGLAS EL24
Space Shuttle Nominal Solid Rocket Motor Propulsion Performance. For presentation at the 1981 JANNAF Propulsion Meeting to be held in New Orleans, LA on May 26-28, 1981.

BLACKWELL, DOUGLAS L. EL24
Space Shuttle Propulsion Performance Improvement Options. For presentation at the 1981 JANNAF Propulsion Meeting to be held in New Orleans, LA on May 26-28, 1981.

BORELLI, M. T. ED11
CHICHESTER, F. D. Bendix
Multi-Level Control Approach for a Modular Structured Space Platform. For publication in AGARD, Agardograph on Spacecraft Guidance and Control.

BROPHY, JOHN EC35
WILBUR, PAUL Colorado State University
Design Model for the Baffle Aperture Region of a Hollow Cathode Thruster. For presentation at the 15th International Electric Propulsion Conference (AIAA) to be held in Las Vegas, NV on April 21-23, 1981.

BROUSSARD, PETER H. FA71
NASA's Automation Work in Underground Coal Mines. For presentation at the 18th Space Congress Sponsored by the Canaveral Council of Technical Societies to be held in Cocoa Beach, FL on April 29-May 1, 1981.

BROWN, RICHARD L. LA41
Commercial Use of Materials Processing in Space. For presentation at the 26th National SAMPE Symposium Exhibition to be held in Los Angeles, CA on April 28-30, 1981.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

BROWN, RICHARD L. LA41
NASA's Interest in Entrepreneurs for Materials Processing in Space in Low-G. For presentation at the Babson Conference on Entrepreneurship Research, Wellesley, MA., April 13-14, 1981.

CAPORALI, ALESSANDRO ES63
Torques on a Nearly Rigid Body in a Relativistic Gravitational Field. For publication in General Relativity and Gravitation Journal.

CAPORALI, ALESSANDRO ES63
Gravitational Perturbations of the Phase of an Electromagnetic Signal. For publication in Physical Review.

CAREY, WILLIAM T. PS06
Abstract — An Experimental Geostationary Platform — A Step Toward the 1990's. For presentation at the AIAA 9th Communications Satellite Systems Conference to be held in San Diego, CA on March 7-11, 1982.

CARTER, T. E. ED15
(NASA/ASEE Summer Faculty Fellow)
Fuel Optimal Maneuvers for Spacecraft with Fixed Thrusters. For publication in the AIAA Journal of Guidance and Control.

CHAPPELL, CHARLES R. ES51
The Magnetosphere — Our Geospace Environment. For presentation at the AIAA 19th Aerospace Sciences Conference to be held in St. Louis, MO on January 11-16, 1981.

CHENG, C. ES01
TANDBERG-HANSEN, et al.
Observation of Solar Flare Transition-Zone Plasmas from the Solar Maximum Mission. For publication in the Astrophysical Journal.

CHENG, C. ES01
TANDBERG-HANSEN, E.
BRUNER, E. Lockheed
ORWIG, L. GSFC
FROST, K. GSFC
KENNY, P. GSFC
WOODGATE, B. GSFC
SHINE, R. GSFC
Spatial and Temporal Structures of Impulsive Busts from Solar Flares Observed in UV and Hard X-Rays. For publication in the Astrophysical Journal.

CLINE, T. L. ES62 and GSFC
WEISSKOPF, M. C., et al. GSFC
Precise Source Location of the Anomalous 1979 March 5 Gamma-Ray Transient. For publication in the Astrophysical Journal.

COSTES, NICHOLAS ES81
STURE, STEIN University of Colorado
The Potential for In-Space Research on Soil Behavior Under Earthquake Excitation. For presentation at the International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics to be held in St. Louis, MO on April 15-May 3, 1981.

CRABTREE, W. L. EC12
High Efficiency, High Concentration Ratio Solar Cell Array. For presentation at the Intersociety Energy Conversion Engineering Conference to be held in Atlanta, GA, on August 9-14, 1981.

CRAFT, HARRY G., JR. JA12
SMITH, M. J. NASA Headquarters
The First Spacelab Mission Status and Lessons Learned. For presentation at the SPIE Technical Symposium East '81 to be held in Washington, D. C. on April 22-24, 1981.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

CRAVEN, P. D. EC51
REASONER, D. L.
CHAPPELL, C. R.
OLSEN, R. C.

Observation of a Storm Time Radial Component of the Magnetospheric E Field. For publication in the American Geophysical Union Fall Annual Mtg.

CROFT, F. MAX AC01
WHITE, DONALD T. CSC
Configuration Management and Accounting Utilizing Interactive Forms Mode Technology. For presentation at the UNIVAC USE Conference to be held in New York, NY on March 16-20, 1981.

DARBRO, WESLEY A. ES62
VON TIESENHAUSEN, GOERG PS01
Sequences Generated by Self-Replicating Systems. For publication in Industrial and Applied Mathematics.

DECHER, R. ES61
ALLAN, D. ES61
ALLEY, C. ES61
WINKLER, G. ES61
Shuttle Experiment to Demonstrate High Accuracy Global Time and Frequency Transfer. For presentation at the 1981 International Geoscience and Remote Sensing Symposium to be held in Washington, D.C. on June 8-10, 1981.

DOZIER, JAN D. EP42
Photoelastic Stress Analysis of the Femoral Component Region of the Total Hip Replacement. For publication to ASME Journal of Biomechanical Engineering, New York, NY.

ELSNER, R. F. ES62
LAMB, F. K. University of Illinois
Accretion by Magnetic Neutron Stars. II. Plasma Entry Into the Magnetosphere

Via Polar Cusps, Diffusion, and Magnetic Flux Reconnection. For publication in The Astrophysical Journal.

ETHRIDGE, E. C. ES73
DUNN, S. A. Bjorksten Research Lab
Air Jet Levitation Furnace System for Observing Glass Microspheres During Heating and Melting. For presentation in the Materials Processing Research in the Reduced Gravity Environment of Space to be held in Boston, MA on November 16-18, 1981.

ETHRIDGE, E. C. ES71
RUSH, J. E.
University of Alabama in Huntsville
STEPHENS, W. K.

University of Alabama in Huntsville
Properties of a Constricted-Tube Air-Flow Levitator. For presentation at the Materials Processing Research in the Reduced Gravity Environment of Space to be held in Boston, MA on November 16-18, 1981.

FELIX, A. RICHARD ED35
Apparatus for Ignition Overpressure Testing of SRB Thermal Curtain. For presentation at the 56th Meeting of Supersonic Tunnel Association, Cambridge, MA, October 7-8, 1981.

FENNELLY, A. J. ES63
Adaptation of the Theu Formalism to the Analysis of Equivalence-Principle Experiments Involving the Weak Interaction: A Beta-Decay Clock. For publication in the Physical Review, Brookhaven, NY.

FENNELLY, A. J. ES63
The Weight, Shape, and Speed of the Universe. For publication in the Journal of General Relativity and Gravitation.

- FENNELLY, A. J. ES63
Observer Reference Triad Rotation, Magnetic Fields, and Rotation in Euclidean Cosmological Models. For publication in the Astrophysical Journal.
- FEREBEE, ROBIN C. ED23
Automation of Vibro-Acoustic Data Banks for Random Vibration Criteria Development. For presentation at the 52nd Shock and Vibration Symposium, New Orleans, LA, October 27-29, 1981.
- FICHTL, G. H. ES82
HOLLAND, R. L.
Exceedance Statistics of Accelerations Resulting from Thruster Firings on the Apollo-Soyuz Mission. For publication in the Journal of Spacecraft and Rockets, New York, NY.
- FINNELL, WOOLSEY, III. PD14
SPS Microwave Power Transmission and Reception Systems. For presentation at the 16th Intersociety Energy Conversion Engineering Conference to be held in Atlanta, GA on August 9-14, 1981.
- FISHMAN, GERALD J. ES62
The Burst and Transient Source Experiment for the Gamma Ray Observatory. For presentation at the Workshop on Gamma-Ray Transients and Related Astrophysical Phenomena to be held at the University of California, San Diego, CA on August 5-8, 1981.
- FISHMAN, GERALD J., et al. ES62
The Burst and Transient Source Experiment for the Gamma-Ray Observatory. For presentation at the 17th International Cosmic Ray Conference to be held in Paris, France on July 12-25, 1981.
- FISHMAN, GERALD J. ES62
Images of Single X-Ray Photons from X-Ray Phosphor Screens. For presentation at the Review of Scientific Instruments to be held in New York, NY.
- FLEISCHMAN, G. L. General Electric
SCOLLON, T. R. General Electric
LOOSE, J. D. EL52
Vapor Chambers for Atmospheric Cloud Physics Laboratory. For presentation at the AIAA 15th Thermophysics Conference to be held in Snowmass, CO on July 14-16, 1980.
- FRAZIER, DONALD O. ES74
Solidification Phenomena. For presentation in the 1981 Fall Meeting of AIME, in Louisville, KY, October 11-15, 1981 and publication in the Trans. Metall. Soc.
- FROST, WALTER
University of Tennessee Space Institute
CAMP, DENNIS W. ES82
Analysis of Turbulence Measured Around a Simulated Block Building. For presentation at the Fourth U. S. National Conference on Wind Engineering Research to be held in Seattle, WA, on July 26-29, 1981.
- GERGELY, T. E. ES52
KUNDU, M. R. CLRO
HILDNER, E.
A Coronal Transient Associated with a High-Speed Type II Burst. For publication in the Astrophysical Journal, Part I.
- GRAVES, J. R. EC12
Power Management of Multi-Hundred kW Spacecraft Power System. For presentation at the IECEC, to be held in Atlanta, GA, in August 1981.
- GRAVES, J. R. EC12
A Programmable Power Processor for Space Power Systems. For presentation

at the IEEE 12th Annual 1981 Electronics Specialist Conference to be held in Boulder, CO, on June 29-July 2, 1981.

GREEN, JAMES L. ES53
Observations Pertaining to the Generation of Auroral Kilometric Radiation. For publication in AGU Monograph.

GOLDIN, R. W. Lockheed
JACQUEMIN, G. G. Lockheed
JOHNSON, W. H. EL52
Spacecraft Automatic Umbilical System. For presentation at the 15th Aerospace Mechanisms Symposium to be held at Marshall Space Flight Center, AL, on May 14-15, 1981.

GREEN, JAMES L. ES53
CALVERT, W. Lockheed Palo Alto Research
Hawkeye Observation of the Auroral Plasma Cavity. For presentation at the American Geophysical Union Fall Meeting to be held in San Francisco, CA, on December 8-12, 1980.

HAGYARD, M. J. ES52
WEST, E. A.
TANDBERG-HANSSSEN, E.
SMITH, J. E.
HENZE, W.
The Photospheric Vector Magnetic Field of a Sunspot and Its Vertical Gradient. For publication in the Proceedings of the Sunspot Workshop, Sunspot, NM.

HAGYARD, M. J. ES52
CUMINGS, N. P. ES52
WEST, E. A. ES52
The MSFC Vecton Magnetograph. For publication in Review of Scientific Instruments.

HAGYARD, M. ES51
LOW, B. C. NRC

TANDBERG-HANSSSEN, E. ES01
On the Presence of Electric Currents in the Solar Atmosphere. I. A Theoretical Framework. For publication in Solar Physics.

HAGYARD, M. J. ES52
TEUBER, D. ES52
CHENG, C. C. ES52
Analysis of Sunspot Observations. For presentation at the 1981 Scientific Meeting of the Solar Physics Division of the American Astronomical Society to be held in Taos, NM, on January 7-10, 1981 and for publication in the Bulletin of the AAS.

HARRIS, C. E. Raytheon Co.
DUNKIN, J. A. EC32
Clear Weather Laser Radar. For presentation at the Electro/81 IEEE Conference to be held in New York, NY, on April 7-9, 1981.

HENRY, J. P. ES62
SPILLER, E. IBM Res.
WEISSKOPF, M. C. ES63
Imaging Performance of a Normal Incidence Soft X-Ray Telescope. For publication in Applied Physics Letters.

HENZE, W. Teledyne Brown Engineering
GURMAN, J. B. Applied Research and Systems

HYDER, C. L. University of Alabama in Huntsville
TANDBERG-HANSSSEN, E. ES01
SMM/UVSP Observations of Magnetic Fields in and Above Sunspots. For presentation at the AAS Solar Physics Division Meeting to be held in Taos, NM, on January 7-10, 1981 and for publication in the Bulletin of the American Astronomical Society.

HILDNER, E. ES52
FISHER, R. R. High Altitude Observatory

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

HOUSE, L. L. High Altitude Observatory
SAWYER, G. B. High Altitude Observatory
WAGNER, W. J. High Altitude Observatory
ILLING, R. M. E.

High Altitude Observatory
McCABE, M. K. University of Hawaii
Evolution of a Coronal Mass Ejection
from ~ 1.5 to $\sim 10 R_{\odot}$. For presenta-
tion at the 1981 Scientific Meeting of
the Solar Physics Division of the Ameri-
can Astronomical Society to be held in
Taos, NM, on January 7-10, 1981 and
for publication in the Bulletin of the
AAS.

HORWITZ, J. L. ES53 (UAH)
CHAPPELL, C. R.
REASONER, D. L.
CRAVEN, P. D.
GREEN, J. L.
BAUGHER, C. R.

Low-Energy Plasma Composition Results
from ISEE-1 and Scatha Satellites. For
presentation at the International Asso-
ciation of Geomagnetism and Aero-
nomy, 4th Scientific Assembly, Edin-
burgh, Scotland, August 3-15, 1981.

HUNG, R. H. ES81 (UAH)
SMITH, R. E. ES81

Gravity Waves, Satellite Imagery and
Balloon Study of Severe Convective
Storms. For presentation at Geophysical
Research Letters, Washington, D.C.

HUNG, R. J. ES81 (UAH)
SMITH, ROBERT E.

Case Study of March 24, 1976, Louisi-
ana Tornado by Using Doppler Sounder,
Satellite Infrared Imagery and Balloon
Observations. For publication in the
Journal of Geophysical Research.

HUNG, R. J. ES81 (UAH)
SMITH, R. E. ES81
Ionospheric Remote Sensing of Medium

Scale Gravity Waves and Tornadoic
Storms. For publication in Il Nuovo
Cimento, Italy.

HYUN, JAE MIN ES82
(NRC Fellow)

The Applicability of the Piecewise
Linear Current Profile in Baroclinic
Instability Problem. For publication in
the Journal of the Meteorological
Society of Japan.

HYUN, JAE MIN ES82
(NRC Fellow)

FOWLIS, WILLIAM W. ES82
WARN-VARNAS, ALEX
Naval Ocean Research & Development
Activity

Numerical Solutions for the Spin-Up of
a Stratified Fluid. For publication in the
Journal of Fluid Mechanics.

JEAN, O. C. JA01
ALLEN, L. B. JA01

Payload Carrier Systems for Conducting
Sortie Mode Science. For presentation
at the AIAA 19th Aerospace Sciences
Meeting to be held in St. Louis, MO, on
January 14, 1981.

JONES, JESS ED21
JEWELL, RON
FENWICK, J.

Space Shuttle Main Engine (SSME)
Pogo Testing and Results. For presenta-
tion at the 52nd Shock and Vibration
Symposium, New Orleans, LA, October
27-29, 1981.

JOHNSON, J. ES51 (NRC)
GREEN, J. L. ES53
SOJKA, J. J. Utah State
WRENN, G. L. Mullard Space Sci. Lab
Observations of Low-Energy (100 eV)
Anisotropic Ion Pitch Angle Distribu-
tions Observed at Low Altitudes with

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

- ISEE-1 and GEOS. For presentation at the International Association of Geomagnetism and Aeronomy, 4th Scientific Assembly, Edinburgh, Scotland, August 3-15, 1981.
- JOHNSTON, M. H. EH22
PARR, R. A.
Low Gravity Solidification Structures in the Sn-15wt percent Pb and Sn-3wt percent Bi Alloys. For presentation at the Materials Research Society Symposium, Boston, MA, November 16-18, 1981.
- JOHNSTON, M. H. EH22
CYBULSKY, M.
PARR, R. A.
The Effect of a Low Gravity Environment on Porosity Formation. For presentation in the 1981 Fall Meeting of AIME, in Louisville, KY, October 11-15, 1981 and publication in the Trans. Metall. Soc.
- JOHNSTON, M. H. EH22
PARR, R. A.
The Influence of Acceleration Forces on Dendritic Growth and Grain Structure. For publication in Metallurgical Transactions.
- JONES, LEE W. EP24
Laser Propulsion. For presentation at the AIAA 16th Thermophysics Conference to be held in Palo Alto, CA on June 23-25, 1981.
- KAUFMAN, JOHN W. ES82
FROST, WALTER FWG Associates, Inc.
Wind-Wheel Turbine. For presentation at the DOE Conference "Energy in Man Built Environment -- The Next Decade" to be held in Vail, CO, on August 3-5, 1981.
- KELLER, V. W. ES83
HALLETT, J.
Influence of Air Velocity on the Habit of Ice Crystal Growth from the Vapor. For publication in the Journal of Crystal Growth.
- KNOTT, K. ES51
FEUERBACHER ESA
CHAPPEL, RICHARD ES51
Spacelab -- An Early Space Station for Science and Technology. For presentation at the IAF Congress, Rome, Italy, September 6-12, 1981.
- KOEPF, DAVID FWG Associates, Inc.
FROST, WALTER
University of Tennessee Space Institute
TURNER, ROBERT E. ES84
Wind Directional Fluctuations. For presentation at the Fourth U. S. National Conference on Wind Engineering Research to be held in Seattle, WA, on July 26-29, 1981.
- KRALL, K. R.
University of Alabama in Huntsville
HAGYARD, M. J. ES52
Magnetic Energy Within a Flare Productive Delta-Configuration. For presentation at the 157th AAS Meeting/Solar Physics Division to be held in Taos, NM, on January 7-10, 1981 and for publication in the Bulletin of the American Astronomical Society.
- KROES, R. L. ES74
LAL, R. B. Alabama A&M University
WILCOX, W. R. Clarkson College
Growth of Triglycine (TGS) Sulfate Crystals by Solution Technique. For presentation at the Materials Processing Research in the Reduced Gravity Environment of Space (Materials Research Society Annual Meeting) to be held in Boston, MA, on November 16-18, 1981.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

KROSS, D. A. ED21
Space Shuttle Solid Rocket Booster
Re-Entry and Deceleration System
Loads and Dynamics. For presentation
at the 52nd Shock and Vibration Sym-
posium, New Orleans, LA, on October
27-29, 1981.

KROSS, D. A. ED21
Space Shuttle Solid Rocket Booster
Water Entry Cavity Collapse Loads.
For presentation at the 52nd Shock and
Vibration Symposium, New Orleans,
LA, on October 27-29, 1981.

KRUPNICK, ALBERT C. FA34
Performance and Life Cycle Cost Analy-
sis of a Light Commercial 25 Ton Solar
Rankine Driven Heating, Cooling, and
Hot Water System. For presentation at
"Energy Economics of the 80's" to be
held in Huntsville, AL, on December
8-10, 1980.

LACY, L. L. ES74
RATHZ, T. J.
ROBINSON, M. B.
Containerless Undercooling and Solidi-
fication of Bulk Metastable Nb₃Ge
Alloys. For publication in Journal of
Applied Physics, Argonne, IL.

LEAHY, D. ES62
University of Texas
DARBRO, W. ES62 (NRC/NAS)
ELSNER, R. ES62
WEISSKOPF, M.
SUTHERLAND, P.
GRINDLAY, J. CFA
KAHN, S. CFA
X-Ray Timing Observations of 4U1626-
67. For presentation at the 158th Meet-
ing of the American Astronomical
Society, to be held in Calgary, Alberta,
Canada, June 28-July 1, 1981, and for
publication in Bulletin AAS.

LEAHY, D. A. ES62
VILENKIN, A. Tufts University
Magnetic Field Generation by Rotating
Black Holes. For publication in the
Astrophysical Journal, Part I.

LEAHY, DENIS A. ES62
Matter-Antimatter Separation in the
Early Universe by Rotating Black Holes.
For publication in the Astrophysical
Journal.

LEDBETTER, F. E. III EH33
CLEMONS, J. M.
PENN, B. G.
Preparation of Silicon Carbide-Silicon
Nitride Fibers by the Controlled Pyroly-
sis of Polycarbosilazane Precursors. For
publication in the Journal of Applied
Polymer Science.

LEE, R. EC32
DiMARZIO, C. EC32
JONES, W. EC32
BILBRO, J. EC32
JOHNSON, S. EC32
KENNEDY, L. EC32
JEFFREYS, H. EC32
Design and Calibration of a Coherent
Lidar for Atmospheric Backscatter Mea-
surement. For presentation at SPIE's
International Symposium and Instru-
ment Display to be held in San Diego,
CA, on August 24-28, 1981.

LOW, B. C. ES01 (NAS)
Nonlinear Force-Free Magnetic Fields.
For publication in Reviews of Geophy-
sics and Space Physics.

LESTER, R. C. JA11
WITT, W. W. NASA/GSFC
Spacelab Mission 2 - The Pallet-Only
Mode Verification Flight. For presenta-
tion at the SPIE Technical Symposium
East '81 to be held in Washington, D.C.,
on April 22-24, 1981.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

- LUCAS, W. R.** DA01
Saturn Launch Vehicles. For presentation at the AIAA Annual Meeting and Technical Display to be held in Long Beach, CA, on May 12-14, 1981.
- McGUIRE, JANICE K.** ES73
MILLER, TERESA Y. ES73
TIPPS, RUBY W. ES73
SNYDER, ROBERT S. ES73
RIGHETTI, PIER GIORGIO
University of Milano (Italy)
New Experimental Approaches to Isoelectric Fractionation of Cells. For publication in Cell Biophysics.
- McGUIRE, JANICE K.** ES73
SNYDER, ROBERT S. ES73
Characterization of Continuous Flow Electrophoresis for Improvement of Resolution and Throughput. For publication in Electrophoresis.
- McGUIRE, J. K.** ES73
SNYDER, R. S. ES73
Operational Parameters for Continuous Flow Electrophoresis of Cells. For presentation at Electrophoresis '81 Electrophoresis Society to be held in Charleston, SC, on April 7-10, 1981.
- MAGNER, Joe**
Perkin-Elmer, Optical Technology Division
Non-Contact Alignment and Spacing of Optics. For presentation at the Los Alamos Conference on Optics on approximately April 8, 1981.
- MITCHELL, ROYCE E.** EE01
Systems Engineering Aspects of the Solar Electric Propulsion System (SEPS). For presentation at the AIAA/JSASS/DGLR 15th International Electric Propulsion Conference to be held in Las Vegas, NV, on April 21-23, 1981.
- MITCHELL, KENNY** PM01
Power System Platform and Meteorological Applications. For presentation at the AIAA 20th Aerospace Sciences Conference, "Meteorological Satellites — Past, Present, and Future," to be held in Orlando, FL, on January 11-14, 1982.
- MOORE, R. L.** ES52
Magnetic Transients in the Chromosphere and Corona in Flares, Filament Eruptions, and Coronal Mass Ejections. For presentation at the Symposium on Flaring Astrophysical Plasmas, Utrecht, Holland, November 2-3, 1981.
- MOORE, R. L.** ES52
Dynamic Phenomena in Sunspots. For publication in the Proceedings of Sacramento Peak Observatory Summer Workshop on the Physics of Sunspots, at Sunspot, NM.
- NAGAI, F.** ES52
A Model of Hot Loops Associated with Solar Flares: II. Thermal Radiations from the Loops. For publication in Solar Physics.
- NAGAI, F.** ES52 (NRC Fellow)
Transient Behaviors of the Flare-Associated Solar Wind. For presentation at the AAS Solar Physics Division Meeting to be held in Taos, NM, on January 7-10, 1981 and for publication in the Bulletin of the American Astronomical Society.
- NAKAGAWA, Y.** ES51 (NRC Associate)
Evolution of Magnetic Field and Atmospheric Responses I. Three-Dimensional Formulation by the Method of Projected Characteristics. For publication in the Astrophysical Journal.
- NAKAGAWA, Y.** ES51 (NRC Associate)
NAKAGAWA, Y. ES51 (NRC Associate)
Evolution of Magnetic Field and Atmospheric Responses. II. Formulation of Proper Boundary Equations. For publication in the Astrophysical Journal.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

Method of Projected Characteristics for Magneto-Fluid Dynamic Problems. For publication in Physics of Fluids.

NAKAGAWA, Y. ES51 (NRC Associate)
HU, Y. Q.

University of Alabama in Huntsville
Derivation of Time-Dependent Boundary Equations for Magneto-Fluid Dynamic Initial-Boundary Value Problems by the Method of Projected Characteristics. For publication in Physics of Fluids.

NEIN, MAX E. PS02
BALLANCE, JAMES O. PS02

Science and Applications Space Platform. For presentation at the 1981 Los Angeles Technical Symposium to be held in North Hollywood, CA, on February 9-13, 1981.

NEIN, MAX PS02
RUNGE, FRITZ

McDonnell Douglas Astronautics Co.
Science and Applications Space Platform. For presentation at the Second AIAA Conference on Large Space Platforms to be held in San Diego, CA, on February 2-4, 1981.

O'DELL, C. R. S&E
SWAMY, K. S. KRISHNA

Tata Institute of Fundamental Research,
Bombay
Statistical Equilibrium in Cometary C₂. III. Triplet-Singlet, Phillips, Balick-Ramsay and Mulliken Bands. For publication in the Astrophysical Journal.

OMENYI, S. N. ES73 (NAS)
SNYDER, R. S. ES73
RHODES, P. ES73

Stability of Erythrocyte Suspensions Layered on Stationary and Flowing Dense Liquids. For publication in the Journal — Separation Science and Technology.

OMENYI, S. N. ES71 (NRC Res. Asso.)
van OSS, C. J.
SNYDER, R. S. ES71

Dependence of Sample Suspension Broadening on Fixed Erythrocyte Concentrations in Stationary and Flowing Systems. For presentation at the Electrophoresis '81 Electrophoresis Society to be held in Charleston, SC, on April 7-10, 1981.

OWENS, J. W. EP44
STEIN, D. S.

Active Thermal Control for an Advanced Power Platform. For presentation at the 11th Intersociety Conference on Environmental Systems, at San Francisco, CA, on July 13-15, 1981.

OWEN, ROBERT B. ES74

Optical Systems Utilized in Low-Gravity Materials Processing Experiments. For presentation at the Optical Society of America 1981 Annual Meeting to be held in Kissimmee, FL, on October 26-30, 1981.

OWEN, R. B. ES74
JOHNSTON, M. H. EH22

Solidification and Associated Fluid Flow in a Low-Gravity Environment. For presentation at the 1981 Fall Meeting of AIME, in Louisville, KY, October 11-15, 1981 and for publication in the Trans. Metall. Soc.

OWEN, ROBERT B. ES74
Gas Laser Behavior in a Low-Gravity Environment. For publication in Optics Letters.

PARNELL, T. A., et al. ES62

A Measurement of the Response of Xenon-Filled Ion Chambers to Cosmic Ray Nuclei Above 20 GeV/Nucleon. For presentation at the 17th International Cosmic Ray Conference to be

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

held in Paris, France on July 13-25, 1981.

PARNELL, T. A., et al. ES62
Chemical Composition of Cosmic Rays at Energies Greater than 10^{13} eV. For presentation at the 17th International Cosmic Ray Conference to be held in Paris, France, on July 13-25, 1981.

PARNELL, T. A., et al. ES62
Heavy Ion Collisions at Energies >10 GeV/Nucleon to 10 TeV/Nucleon. For presentation at the 17th International Cosmic Ray Conference to be held in Paris, France, on July 13-25, 1981.

PARNELL, T. A., et al. ES62
Proton-Nucleus Interactions at Energies Above 8 TeV. For presentation at the 17th International Cosmic Ray Conference to be held in Paris, France, on July 13-25, 1981.

PARNELL, T. A., et al. ES62
Proton Spectrum in the Energy Range 10^{13} - 10^{14} eV. For presentation at the 17th International Cosmic Ray Conference to be held in Paris, France, on July 13-25, 1981.

PARNELL, T. A. ES62
Japanese-American Cooperative Emulsion Experiment (JACEE). For presentation at the 17th International Cosmic Ray Conference to be held in Paris, France, on July 13-25, 1981.

PARNELL, T. A. ES62
A Measurement of the Energy Dependence of Cosmic Ray Abundances in the Energy Range 0.5 to 2 GeV/Nucleon. For presentation at the 17th International Cosmic Ray Conference to be held in Paris, France, on July 13-25, 1981.

PATTY, S. R.

University of Alabama in Huntsville
HAGYARD, M. J. ES52

Analysis of the Transverse Component of the Magnetic Field in Region of Magnetic Classification. For presentation at the AAS Solar Physics Division Meeting to be held in Taos, NM, on January 7-10, 1981 and for publication in the Bulletin of the American Astronomical Society.

POWELL, LUTHER E. PM01
Power System Platform (PSP) Program. For presentation at "Remote Manipulator System Users Conference" to be held in Toronto, Canada, May 5-7, 1981.

POWERS, L. B. EP24

BAILEY, R. L. Jet Propulsion Laboratory Shuttle Solid Rocket Motor Nozzle Alternate Ablative Evaluation. For presentation at the AIAA/SAE/ASME 17th Joint Propulsion Conference to be held in Colorado Springs, CO, on July 26-30, 1981.

PRIEST, C. C. PS04
Space Platforms/Stations. For publication in AIAA Student Journal, Fall 1981 Issue.

RAMSEY, VERNON W. ES82 (NRC Assoc.)
FICHTL, GEORGE H. ES82
Bernard Instability Due to White Noise Jitter. For publication in the Physica of Fluids.

RATHZ, T. J. ES74
ROBINSON, M. B. ES74
LACY, L. L.

Exxon Production Research Company Containerless Undercooling and Solidification of Bulk Metastable Nb_3Ge Alloys. For presentation in the 1981 Fall Meeting of AIME, in Louisville, KY,

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

- on October 11-15, 1981 and for publication in the Trans. Metall. Soc.
- RAY, J. R.** ES63
Perfect Fluids in General Relativity. For publication in Il Nuovo Cimento, Bologna, Italy.
- RAY, Dr. John R.** ES63
Kinetic Theory in Astrophysics and Cosmology. For publication in the Astrophysical Journal.
- REASONER, DAVID L.** ES53
CRAVEN, P. D.
CHAPPELL, C. R.
Characteristics of Ion Populations in the Plasmasphere and Plasma Trough. For publication in EOS, Trans. AGU.
- REASONER, DAVID L.** ES53
CHAPPELL, C. R.
FIELDS, STANLEY A.
LEWTER, W. J.
A Light Ion Mass Spectrometer for Space Plasma Investigations. For publication in the Review of Scientific Instruments, in New York, NY.
- RHODES, PERCY H.** ES73
SNYDER, ROBERT S. ES73
The Effect of Axial Gradients on the Fluid Flow in an Electrophoresis-Type Separation Chamber. For presentation at the Materials Processing Research in the Reduced Gravity Environment of Space to be held in Boston, MA, on November 16-18, 1981.
- RHODES, PERCY H.** ES73
High-Resolution Continuous-Flow Electrophoresis in the Reduced Gravity Environment. For presentation at the Electrophoresis '81 Electrophoresis Society to be held in Charleston, SC, on April 7-10, 1981.
- RHODES, P. H.** ES73
SAVILLE, D. A. ES73
SNYDER, R. S. ES73
Development of a Mathematical Model of Continuous Flow Electrophoresis. For presentation at the Electrophoresis '81 Electrophoresis Society to be held in Charleston, SC, on April 7-10, 1981.
- ROBINSON, M. B.** ES74
RATHZ, R. J. ES74
LACY, L. L. Exxon
Solidification Studies of Nb-Ge Alloys at Large Degrees of Supercooling. For presentation at the Materials Processing Research in the Reduced Gravity Environment of Space to be held in Boston, MA, on November 16-18, 1981.
- ROSE, R. E.** TRW
NAKANO, H. TRW
STAFSA, J. A. TRW
BRADY, W. L. FA81
The Recovery of the HEAO-2 Observatory. For presentation at the AAS Annual Rocky Mountain Guidance and Control Conference to be held at Keystone, CO, on January 31-February 4, 1981.
- RUSH, J. E.**
University of Alabama in Huntsville
- STEPHENS, W. K.**
University of Alabama in Huntsville
- SCHAFER, C. F.** ES82
HOLLAND, R. L. ES82
Acoustic Levitation Studies with Application to the Analysis of Sample Motion in Spar Acoustic Levitation Experiment. For presentation at the Materials Research Society Meeting to be held in Boston, MA, on November 16-20, 1981 and for publication.
- SEKIHARA, K.** ES83
Polyatomic Molecule Decomposition in

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

- the Stratosphere During Geomagnetic Storms. For publication in the Journal of Geophysical Research.
- SEKIHARA, K.** ES81 (NRC)
Polyatomic Molecule Decomposition in the Stratosphere During Magnetic Storm. For presentation at the AGU Spring Meeting to be held in Baltimore, MD, on May 25-29, 1981.
- SIMS, JOHN H.** JA31
DODECK, HAUKE ESA/SPICE
Mission Peculiar Equipment (MPE) for Spacelab Mission 1 Payload. For presentation at SPIE's Technical Symposium East, "Optics and Electro-Optics" to be held at NASA Headquarters, Washington, D.C., on April 23, 1981.
- SLOYER, JOHN L.** ES73
McGUIRE, JANICE K. ES73
Fractionation of Bacterial Capsular Polysaccharides by Electrokinetic Methods. For presentation at the Electrophoresis '81 Electrophoresis Society Meeting to be held in Charleston, SC, on April 7-10, 1981.
- SLOYER, JOHN L., Jr.**
University of Alabama
- McGUIDE, JANICE K.** ES73
SNYDER, ROBERT S. ES73
Electrokinetic Separation of Pneumococcal Polysaccharides: Potential for Increased Immunogenicity. For presentation at the American Society of Immunologists to be held in Atlanta, GA, on April 13-15, 1981.
- SMALLY, LARRY L.** ES63
Post-Newtonian Approximation of the Maximum Four-Dimensional Yang-Mills. For publication in Physical Review D.
- SMITH, J. B., Jr.** NOAA
KRALL, K. R. University of Alabama
HAGYARD, M. J. ES52
WEST, GEORGE ES52
The Magnetic Evolution of AR2372 (April 1980). For presentation at the 1981 Scientific Meeting of Solar Physics Division of the American Astronomical Society to be held in Taos, NM, on January 7-10, 1981.
- SMITH, O. E.** ES81
ADELFGANG, S. I.
Computer Sciences Corporation
A Model for Gust Amplitude and Gust Length Based on the Bivariate Gamma Probability Distribution Function. For presentation at the AIAA 19th Aerospace Sciences Meeting to be held in St. Louis, MO, on January 12-15, 1981.
- SMITH, O.E.** ES81
AUSTIN, LAMBERT JSC
Sensitivity Analysis of the Space Shuttle to Ascent Wind Profiles. For presentation at the AIAA 8th Atmospheric Flight Mechanics Conference to be held in Albuquerque, NM, on August 19-21, 1981.
- SMITH, ORVEL E.** ES81
FICHTL, GEORGE H. ES81
VAUGHAN, W. W. ES81
Wind Profile and Gust Models for Aerospace Vehicle Design and Operation. For presentation at the AIAA 8th Atmospheric Flight Mechanics Conference to be held in Albuquerque, NM, on August 19-21, 1981.
- SMITH, RALPH R.** CM11
The Labor Relations Factor in Decision-Making. For presentation at Management Magazine OPM, Washington, D.C., on March 19, 1981.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

SNODDY, WILLIAM C. PS01
Science and Applications Space Platforms. For publication in *Astronautics and Aeronautics*.

SNYDER, R. S. ES73
DUNING, J. Indiana University
Electrophoretic Separation of Lunar Soils in a Space Manufacturing Facility. For presentation at the Fifth Princeton/AIAA/SSI Conference on Space Manufacturing, to be held at Princeton, NJ, on May 18-21, 1981, and publication in the Proceedings.

SNYDER, Robert S. ES73
Review of the NASA Electrophoresis Program. For presentation at the Electrophoresis '81 Electrophoresis Society to be held in Charleston, SC, on April 7-10, 1981.

SPEER, F. A. TA01
The Space Telescope. For presentation at the AIAA 50th Anniversary Meeting to be held in Long Beach, CA, on May 12-14, 1981.

STOKES, JACK W. EL15
Comparative Evaluation of Operability of Large Space Structure Connectors. For presentation at the 15th Aerospace Mechanisms Symposium to be held at MSFC, Huntsville, AL, on May 14-15, 1981.

STONE, NOBIE H. ES53
The Plasma Wake of Mesosonic Conducting Bodies II: An Experimental Parametric Study of the Mid-Wake Ion Density Peak. For publication in the *Journal of Plasma Physics* (Great Britain).

TANDBERG-HANSEN, et al. ES01
Steady Flows in the Solar Transition

Region Observed with SMM. For publication in *Astrophysical Journal Letters*.

TANDBERG-HANSEN, E. ES01
Preliminary Observations and Results Obtained with the Ultraviolet Spectrometer and Polarimeter. For publication in the *Astrophysical Journal*.

TANDBERG-HANSEN, E. ES01
Ultraviolet Spectroscopy and Polarimetry on the Solar Maximum Mission. For publication in *Space Research*

TANNER, RAY E. EE41
Spacelab: Subsystems Performance Capabilities. For presentation at the Society of Photo-Optical Instrumentation Engineers to be held in Bellingham, WA, in April 1981.

TANG, CHUNG-MUH ES82
FICHTL, G.H.
The Role of Latent Heat Release in Baroclinic Waves - Without Beta Effect. For publication in the *Journal of the Atmospheric Sciences*.

TATOM, FRANK B.
Engineering Analysis, Inc.
FICHTL, GEORGE H. ES82
SMITH, STEPHEN R.

Engineering Analysis, Inc.
Simulation of Atmospheric Turbulent Gusts and Gust Gradients. For presentation at the 19th AIAA Aerospace Sciences Meeting to be held in St. Louis, MO, on January 12-15, 1981.

THOMPSON, J. R. SA51
Space Shuttle Main Engine. For presentation at AIAA/SETP/SFTE/SAE Flight Testing Conference, to be held at Las Vegas, NV, on November 11-13, 1981.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

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|--|-------------------|------------------------|
| TURNER, L. D. | EP45 | |
| HUMPHRIES, W. R. | EP45 | |
| LITTLES, J. W. | EP45 | |
| Effects of the Specular Orbiter Forward Radiators on Typical Spacelab Payload Thermal Environment. For presentation at the 16th AIAA Thermophysics Conference to be held in Palo Alto, CA on June 23-25, 1981. | | |
| URBAN, EUGENE W. | ES63 | |
| Optics of Experiments in Spacelab 2. For presentation and publication at the Annual Meeting of Optical Society of America; Journal of the Optical Society of America in Orlando, FL, on October 27-30, 1981. | | |
| URBAN, E. W. | ES63 | |
| KATZ, L. | ES63 | |
| WATTS, RAYMOND | | |
| Smithsonian Astrophysical Observatory Development and Integration of the Infrared Telescope for Spacelab. For presentation at the 11th Intersociety Conference on Environmental Systems, ASME, to be held in San Francisco, CA, on July 13-15, 1981. | | |
| VON TIESENHAUSEN, GEORG | PS01 | |
| Self-Replicating Systems -- A Systems Engineering Approach. For presentation at the AIAA/SSI Fifth Conference on Space Manufacturing to be held in Princeton, NJ, on May 18-21, 1981. | | |
| WAITE, J. H. | ES51 | |
| HORWITZ | UAH | |
| He in the Terrestrial Plasmasphere. For publication in the Americal Geophysical Union Fall Annual Meeting. | | |
| WAITE | ES52 (NRC) | |
| NAGY, A. F. | | |
| ATREYA, S. K. | | |
| DONAHUE, T. M. | | |
| CRAVENS, T. E. | | University of Michigan |
| The Upper Atmosphere and Ionosphere of Saturn. For presentation at the International Association of Geomagnetism and Aeronomy, Fourth Scientific Assembly, Edinburgh, Scotland, August 3-15, 1981. | | |
| WEISSKOPF, MARTIN C. | ES62 | |
| The Advanced X-Ray Astrophysics Facility. For presentation at the UHURU Memorial Symposium to be held in Greenbelt, MD, on December 13, 1980. | | |
| WHITAKER, ANN F. | EH12 | |
| Performance of Candidate SEPS Solar Cells as a Function of Low Temperature and Low Intensity Exposure and 1 MeV Electron Irradiation. For presentation at the 15th International Electric Propulsion Conference to be held in Las Vegas, NV, on April 21-23, 1981. | | |
| YOUNG, L. E. | EC12 | |
| "Zero-G" Testing of a Flexible Solar Array. For presentation at the 15th Aerospace Mechanisms Symposium to be held in Huntsville, AL, on May 14-15, 1981. | | |
| WHITE, J. B. | EF12 | |
| A Semiconductor Memory System Architecture which Tolerate Radiation Induced Soft Errors. For presentation at IEEE Transactions on Aerospace and Electronic Systems. | | |
| WILSON, GREGORY S. | ES84 | |
| Structure and Dynamic of Mesoscale Systems Influencing Severe Thunderstorm Development, AVE/SESAME I. For presentation at the 12th Severe Local Storms Conference 62nd Annual Meeting of AMS to be held in San Antonio, TX, on January 11-15, 1982. | | |

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

WILSON, GREGORY S. ES84
Medium-Range, Objective Predictions of
Thunderstorm Location and Severity
for Aviation. For presentation at the
AIAA 19th Aerospace Sciences Meeting
to be held in St. Louis, MO, on January
12-15, 1981.

WITHEROW, W. K. ES74
FACEMIRE, B. R. ES74
LACY, L. L.

Exxon Production Research Company
Optical Studies of a Model Binary
Miscibility Gap System. For presentation
in the 1981 Fall Meeting of AIME, in
Louisville, KY, on October 11-15, 1981
and publication in the Trans. Metall.
Soc.

WOJTALIK, FRED S. EE01
Project HEAO — Revisited. For pre-
sentation at the Eighth IFAC World
Congress to be held in Kyoto, Japan on
August 21-28, 1981.

WU, S. T. ES01 (UAH)
HU, Y. Q. UAH
NAKAGAWA, Y. UAH
TANDBERG-HANSEN ES01
Induced Mass and Wave Motions in the
Solar Atmosphere Due to Movements

of Flux Tube Foot-Points in the Photo-
sphere. For presentation at the AGU
Spring Meeting, to be held in Baltimore,
MD, May 25-29, 1981 and for publica-
tion in EOS, Trans. AGU.

WYCKOFF, JAMES AB43
Built-Up Roofing Techniques at Marshall
Space Flight Center, 1976-1980. For
presentation at the National Technical
Association Convention, to be held in
Detroit, MI, on August 4, 1981.

WARMEROD, JOHN D. ED33
VANIMAN, JEROLD L. ED33
Thermal Protection System for the
External Tank. For presentation at the
AIAA 11th Intersociety Conference on
Environmental Systems to be held in
San Francisco, CA, on July 13-15, 1981.

WEISSKOPF, M. C. ES62
ELSNER, R. F. ES62
SUTHERLAND, P. G. McMaster University
GRINDLAY, J. R.

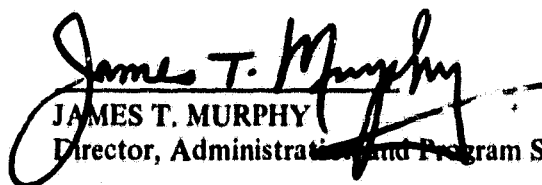
Harvard-Smithsonian Center for Astrophysics
Search for High Frequency Pulsations
in the Onset of the March 5 Gamma-Ray
Burst. For publication in the Astro-
physical Letters in Baltimore, MD.

APPROVAL

FY 1981 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS, AND PRESENTATIONS

Compiled by Sarah Thacker

The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or Atomic Energy Commission programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.


JAMES T. MURPHY
Director, Administration and Program Support